DOCUMENT RESUME

ED 253 950 EA 017 531

TITLE South Carolina School Facilities Planning and Construction Guide.
INSTITUTION South Carolina State Dept. of Education, Columbia. Office of School Planning and Building.
PUB DATE 83
NOTE 191p.
PUB TYPE Guides - Non-Classroom Use (055)

EDRS PRICE MF01/PC08 Plus Postage.
DESCRIPTORS Accessibility (for Disabled); Architects; Bids; Design Requirements; *Educational Facilities Design; *Educational Facilities Planning; Electrical Systems; Elementary Secondary Education; Emergency Programs; Engineers; *Facility Guidelines; Legal Responsibility; Mechanical Equipment; Plumbing; Records (Forms); *School Construction; Site Selection; *State Legislation; *State Standards; Structural Elements (Construction)
IDENTIFIERS *South Carolina

ABSTRACT

This publication, the result of a review of state school construction regulations, was developed for the purpose of providing an up-to-date guide on current laws, regulations, and the technology of the building profession. It is intended for architects and engineers as well as for school superintendents and boards of trustees, all of whom are asked to utilize the guide in each phase of planning and construction. Throughout the guide, mandated requirements are differentiated from recommendations or commentary by the use of "shall" or "shall not" in bold type. The material is presented in 15 divisions, as follows: (1) general requirements, (2) site selection, (3) design criteria, (4) barrier-free design, (5) emergency preparedness, (6) schematic and design development phase, (7) construction documents phase, (8) bidding and award phase, (9) construction phase, (10) plumbing, (11) mechanical, (12) electrical, (13) sample forms, (14) checklists, and (15) reference material. (MLF)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED253950

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

X This document has been reproduced as received from the person or organization originating it.

Minor changes have been made to improve reproduction quality.

- Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

E. L. Knight

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

SOUTH CAROLINA SCHOOL FACILITIES PLANNING AND CONSTRUCTION GUIDE

Prepared by

OFFICE OF SCHOOL PLANNING AND BUILDING
Robert I. Upshur, AIA, Director
DIVISION OF FINANCE AND OPERATIONS
Henry G. Hollingsworth, Jr., Deputy Superintendent

1983

SOUTH CAROLINA DEPARTMENT OF EDUCATION
CHARLIE G. WILLIAMS
State Superintendent of Education
An Equal Opportunity Agency

EA 017 531

ACKNOWLEDGMENTS

This guide has been prepared by the Office of School Planning and Building under the jurisdiction of Dr. Henry Hollingsworth, Deputy Superintendent of Finance and Operations, South Carolina Department of Education.

Acknowledgment is made to the various consultants and supervisors in the Department of Education, as well as to many persons of other state agencies and boards. Acknowledgment is also made to several outside educational and technical consultants and to a number of school district superintendents, architects, and engineers who reviewed various drafts of the document. The advice and help of all these sources is greatly appreciated.

Consulting engineers who helped prepare Divisions 10, 11, and 12 and also the engineers who reviewed the draft copies are recognized in each of those divisions.

Particular thanks are also extended to the members of a special committee who met several times with the Office of School Planning and Building to review each draft copy of the guide in its formative stages and who also made many valuable contributions.

District Superintendents

Mr. Charles B. DuBose, Jr.	Dorchester District 2
Mr. Thomas E. McInville	Georgetown County
Dr. Harold D. Patterson	Spartanburg District 7
Dr. Robert W. Paskel	Aiken County
Mr. Paul T. Rawl	Lexington District 1
Mr. George W. Seaborn	Anderson District 1
Mr. T. B. Willis	Aiken County

Facility Planner

Dr. Patrick L. Herron	Greenville County

Architects

Mr. Henry D. Boykin, AIA	Camden
Mr. William T. Davis, AIA	Greenville
Mr. William N. Geiger, Jr., AIA	Columbia
Mr. Robert S. James, AIA	Sumter
Mr. W. Craig Jumper, AIA	West Columbia
Mr. Demetrios C. Liollio, AIA	Charleston
Mr. J. Eugene Matthews, AIA	Sumter
Mr. William Reaves McCall, AIA	Hartsville
Mr. Michael McMillan, AIA	Greenville
Mr. Howard M. Moormann, AIA	Aiken
Mr. Charles B. Smith, AIA	Florence
Mr. James B. Westmoreland, AIA	Spartanburg
Mr. Milton V. White, AIA	Anderson

Office of School Planning and Building

Mr. Robert I. Upshur, AIA
Mr. G. Stuart Clarkson
Mr. John R. Bryan, Jr.
Mr. James L. Tupper, AIA

FOREWORD

In 1980, the South Carolina Department of Education, Office of School Planning and Building, began a thorough review of the regulations contained in the South Carolina Facilities and Construction Guide, 1969 edition, with the purpose of bringing the guide up-to-date with current laws, regulations and the technology of the building profession. This review resulted in the development of this new South Carolina School Facilities Planning and Construction Guide, 1983 edition. This edition should be of great benefit to architects and engineers as well as school superintendents and boards of trustees. The entire building process will be strengthened and less complicated if all concerned in the process utilize this guide in each phase of planning and construction.

Particular attention is called to the contributions of Robert I. Upshur who retired as Director, Office of School Planning and Building, on July 1, 1983. This guide was developed under his leadership and its quality attests to his commitment to excellence in the building of schools for South Carolina's students.

On December 10, 1982 the State Board of Education approved the regulations to be contained in the new guide and then submitted them to the South Carolina General Assembly for review. These regulations became effective on May 27, 1983 after having been published in the **State Register** (Vol. 7, Issue No. 5) as final regulations.

CHARLIE G. WILLIAMS
State Superintendent of Education

TABLE OF CONTENTS

DIVISIONS		PAGES
1	GENERAL REQUIREMENTS	1-1 thru 1-9
2	SITE SELECTION	2-1 thru 2-3
3	DESIGN CRITERIA	3-1 thru 3-52
4	BARRIER-FREE DESIGN	4-1 thru 4-2
5	EMERGENCY PREPAREDNESS	5-1 thru 5-2
6	SCHEMATIC AND DESIGN DEVELOPMENT PHASE	6-1 thru 6-5
7	CONSTRUCTION DOCUMENTS PHASE	7-1 thru 7-24
8	BIDDING AND AWARD PHASE	8-1 thru 8-6
9	CONSTRUCTION PHASE	9-1 thru 9-7
10	PLUMBING	10-1 thru 10-14
11	MECHANICAL	11-1 thru 11-8
12	ELECTRICAL	12-1 thru 12-13
13	SAMPLE FORMS	13-1 thru 13-19
14	CHECKLISTS	14-1 thru 14-2
15	REFERENCE MATERIAL	15-1 thru 15-15

(See each division for a more detailed index of that particular division.)

1.01 INDEX OF SECTIONS INCLUDED IN THIS DIVISION

Section Number and Title		Page
1.02	Authority	1-1
1.03	Definitions	1-1
1.04	Classifications of Schools	1-2
1.05	Scope of Responsibility	1-2
1.06	Professional Services	1-3
1.07	Basic Codes and Standards	1-4
1.08	S. C. OSHA Standards	1-6
1.09	DHEC Standards	1-6
1.10	For School Administrators	1-7

1.02 AUTHORITY

1. Section 59-5-60, *Code of Laws of South Carolina, 1976*, gives the State Board of Education authority to adopt policies, rules, and regulations for the conduct and furtherance of the public school program in South Carolina. Such policies, rules, and regulations as herein adopted are deemed to have the effect of law.

2. Section 59-23-40, *Code of Laws of South Carolina, 1976*, requires that drawings and specifications for all public school buildings be submitted to, and approved by, the State Superintendent of Education or his agent, prior to being constructed.

3. Section 59-23-190, *Code of Laws of South Carolina, 1976*, requires that all public school buildings be inspected and approved by the State Superintendent of Education or his agent, before first being occupied.

4. This guide **shall** supercede all contents of a previous guide of similar title, dated 1969.

1.03. DEFINITIONS

1. Throughout this guide, mandated requirements are differentiated from recommendations or commentary as follows.

   a. **Mandates:** Indicated by use of **"shall"** or **"shall not"** (bold type).

   b. **Recommendations** or **commentary**: Indicated by words or phrases such as "should," "may," "it is recommended that," and the like. Any such words or phrases indicate an option that is to be decided by the school district authorities and/or architect.

2. **OSP&B**: Abbreviation for the Office of School Planning and Building, South Carolina Department of Education.

3. **DHEC**: Abbreviation for the South Carolina Department of Health and Environmental Control.

4. **District**: Delegated authorities of the applicable school district.

5. **SBC**: Abbreviation for the Standard Building Code.

6. **OSHA**: Abbreviation for the Occupational Safety and Health Administration.

7. **DMP**: Abbreviation for the Defined Minimum Program, the educational guidelines adopted by the State Board of Education for all school districts.

8. **Implied Method of Construction**: This guide is written throughout as if construction, when referred to or implied, is to be by the single contract method. Specific mention is made in one area each of Divisions 7, 8, and 9 concerning the multiple prime contract method of construction (construction management), construction by a school district,

and "fast track" construction. No one type of construction is necessarily recommended over another, but rather the district should choose the type that is most advantageous for a particular situation.

9. **Structure of This Guide**

   a. Division = An entire chapter ("DIVISION 2—SITE SELECTION," for example).

   b. Section = A subheading under a division ("2.03 SITE APPROVAL," for example).

   c. Item = A numbered subheading under a section ("2. **Plat**," for example).

   d. Paragraph = A lettered subheading under an item, such as a, b, c, etc.

1.04 CLASSIFICATIONS OF SCHOOLS

1. The following classifications are recognized as the organizational patterns for South Carolina schools (source is DMP standards).

   a. Elementary: Combination of grades kindergarten through eight (i.e., K-6, K-8, 1-6, 1-7, 1-8, etc.), except that by themselves, grades 7-8 cannot be classed as elementary. In actuality, almost all elementary schools are K-6 or combinations thereof; it is unusual for grades 7 or 8 to be part of an elementary school.

   b. Middle: Combination of grades five through eight (i.e., 5-7, 7-8, 6-8).

   c. Junior High: Grades 7-8, 7-9, or 8-9 (grades 7-8 may be either a middle or a junior high school).

   d. Senior High: Grades 7-12, 8-12, 9-12, 10-12, or 11-12.

2. Throughout this guide, the terms "elementary" or "secondary" as applied to schools shall be defined as follows.

   a. **Elementary**: Includes schools with grades as listed in Item 1, Paragraph a preceding.

   b. **Secondary**: Includes middle, junior high, and senior high schools.

1.05 SCOPE OF RESPONSIBILITY

The following **shall** be included within the requirements of this guide and, therefore, under the jurisdiction of OSP&B, **regardless of the source of funding for the project.**

1. All new structures, and additions and/or renovations or alterations to existing structures, in connection with the public education program in South Carolina.* This **shall** include student-related as well as non-student-related facilities.

2. Adjunct work related to the preceding facilities whether included as a part of an overall construction contract or awarded as a separate contract:**

   a. Sitework and associated construction, including grading, paving, storm drainage, utilities, athletic facilities and stadiums, pressboxes, and playing field lighting

   b. Water supply and sewage disposal systems

   c. Building sprinkler systems

   d. Fixed equipment where plumbing, mechanical, or electrical work has to be interrelated to a building structure (as in the case of kitchen or science equipment)

* IT MAY NOT BE FEASIBLE TO APPLY ALL THE REQUIREMENTS OF THIS GUIDE TO RENOVATION OR ALTERATION PROJECTS INVOLVING EXISTING STRUCTURES AND IT SHALL BE DISCRETIONARY WITH THE OSP&B TO DETERMINE THE EXTENT OF SUCH REQUIREMENTS PARTICULARLY WHERE LIFE AND BUILDING SAFETY ARE CONCERNED

REROOFING PROJECTS WILL NOT NORMALLY REQUIRE PRIOR REVIEW AND APPROVAL BY THE OSP&B EXCEPT WHERE ANY STATE FUNDS ARE USED IN WHICH CASE PRIOR REVIEW AND APPROVAL **SHALL** BE REQUIRED

** SOME REQUIREMENTS OF THIS GUIDE SUCH AS SUBMITTAL OF SCHEMATIC OR DESIGN DEVELOPMENT DRAWINGS OR CODE ANALYSIS FOR EXAMPLE MAY NOT APPLY TO ALL SUCH LISTED ADJUNCT WORK CONSULT OSP&B ON AN INDIVIDUAL BASIS

3. **Exception**: Contracts for furnishings and portable equipment (such as for classroom and library furnishings, vocational shop equipment and such) are excluded from the requirements of this guide and are a district responsibility.

4. **Exception**: The design and construction of "relocatable" classroom units is excluded from the requirements of this guide and is contained in a separate publication.

1.06 PROFESSIONAL SERVICES

1. **Architects**

   a. The services of an architect registered to practice in South Carolina **shall** be required for the design of all new structures, additions, and/or renovations or alterations to existing structures, and adjunct work as outlined under Section 1.05, Items 1 and 2, except as otherwise stipulated herein. Such services **shall** include what is commonly termed "basic services," consisting of the schematic and design development, construction documents, bidding and award, and construction phases of the project.

   b. The scope of the architects' services **shall** also include the services of professional engineers, registered to practice in South Carolina and who are qualified, by education and experience, to design the structural, plumbing, mechanical, and electrical portions of the drawings and specifications.

2. **Professional Engineers, Landscape Architects and Specialists**

   a. Where agreed to by OSP&B in advance, the services of the architect may be deleted and comparable basic services of a professional engineer or landscape architect, each registered to practice in South Carolina, may be substituted in lieu of where a project is almost entirely within the design realm of such professionals.

   b. The preceding likewise applies to the services of such specialists as roofing, carpeting, and kitchen planning consultants if they are independent practitioners and if their credentials are recognized by OSP&B.

3. By joint resolutions of the South Carolina Architectural Registration Board and the Engineering Examiners' Board, dated July 25, 1962 it is permissible for an architect to perform work in the field of engineering if it is incidental to his practice of architecture, if it is of a minor nature, and if he is qualified to perform the work. Conversely, professional engineers may perform incidental work in the field of architecture under the same conditions.

4. All professionals and specialists mentioned in Items 1 and 2 preceding **shall** be independent practitioners, except as noted below, and **shall** have no financial or other self-serving interests in contractors, subcontractors, manufacturers, or jobbers under their jurisdiction where a direct conflict of interest could occur.

   Full-time employees of school districts who qualify as professionals or specialists, as outlined in Items 1 and 2 preceding, may also be used to furnish required professional services for projects of a small nature.

5. **When Professional Services Are Not Required**

The services of professionals and specialists mentioned in Items 1 and 2 preceding will not normally be required in the following situations (exceptions are noted).

a. For projects of a very small nature, if OSP&B agrees that the scope of the project does not justify the use of such professionals or specialists mentioned above. In such cases, the district will need to submit a prior written request for waiver (see DIVISION 13—SAMPLE FORMS).

b. For minor renovation or alteration work where building codes, laws, or regulations are not involved, or for work that is cosmetic in nature (painting, etc.), or for work which is of a routine maintenance nature. OSP&B should be consulted in advance.

c. For reroofing projects if **no** state funds are used to finance the work.

- However, the services of an architect and/or a roof consultant are recommended for all membrane roof work and **shall** be required where any such projects use state funds.

d. For carpeting or locker installations.

- However, if either of these items are to be furnished outside the basic services of an architect, the district superintendent is reminded that there are code requirements for carpeting (concerning flammability in particular) that **shall** be met, and that lockers **shall** be installed in compliance with the requirements of this guide as to minimum corridor widths.

e. For auditorium seating or folding gymnasium seating installations.

- However, if either of these items is to be furnished outside the basic services of an architect, bids should be solicited by the district based on a performance specification, after which the successful bidder **shall** submit complete drawings and specifications to the OSP&B for prior approval, along with certification by the manufacturer that all applicable code requirements have been met.

f. For prefabricated walks and canopies, or prefabricated spectator bleachers for outdoor athletic facilities.

- However, if any of these items are to be furnished outside the basic services of an architect, bids should be solicited by the district based on a performance specification, after which the successful bidder **shall** submit complete drawings and specifications to the OSP&B for prior approval. Furthermore, a structural engineer registered to practice in South Carolina **shall** be retained by the successful bidder to approve and stamp the drawings and specifications and to certify by letter that all applicable code requirements have been met. The engineer may be in the employ of the manufacturer of the units if he meets the above registration requirement.

g. In cases where a district elects not to use professional services as outlined in the preceding, it **shall** be incumbent upon the district to ascertain that the work is installed correctly and in accordance with any applicable codes or regulations.

1.07 BASIC CODES AND STANDARDS

1. The following codes and standards (based on editions in effect at the time of submission of design development drawings to the OSP&B by the architect) **shall** establish minimum requirements.

a. The codes published by the Southern Building Code Congress International Inc. (Birmingham, Alabama), and all codes and standards referenced therein. The basic governing codes are the Standard Building Code, the Standard Plumbing Code, the Standard Mechanical Code, the Standard Gas Code, the Standard Fire Prevention Code, and the National Electrical Code.

References in this guide to these basic codes by section numbers are from the 1982 editions.

b. Where the above basic governing codes do not adequately provide for every contingency, conformance with NFPA Standards, American National Standards Institute, or other nationally recognized and accepted standards **shall** be evidence of compliance with the intent of this guide; the provisions of such standards should be followed unless deviation is approved by OSP&B.

c. Building Energy Efficiency Standard Act, Sections 6-10-10 through 6-10-90, *Code of Laws of South Carolina, 1976* and as amended in 1981.

d. Also consult Divisions 10, 11, and 12 for further referenced codes and standards under the plumbing, mechanical, and electrical heads.

e. See Section 1.08 for reference to OSHA standards.

2. Resolutions of Conflicts

a. Where state statutes or county or municipal ordinances or codes at the place of building are at variance with the adopted codes or standards or other provisions of this guide, the most stringent requirements **shall** govern. The architect **shall** notify OSP&B, however, of any such conflicts as soon as they become known.

b. Where this guide is specific and is at variance with a code or standard referenced herein, this guide **shall** govern whether more or less stringent, except that, as mentioned in Paragraph a preceding, this guide **shall not** be less stringent than any state statute, or county or municipal ordinance or code.

3. Allowable Types of Construction

The following minimum types of construction as defined by the Standard Building Code **shall** govern.

Types I, II, and III[*]	Optional for all buildings but mandatory for buildings where areas allowed by the Standard Building Code for Type IV are exceeded or where requirements for fire districts are in effect.
Type IV Protected[*]	For all two-story buildings whether or not occupied by students.
Type IV Unprotected[*]	For all one-story buildings in which students are located (except "relocatable" classroom units, the requirements for which are contained in a separate guide).

[*] NOTE THE FOLLOWING VARIANCE FROM THE SBC: MATERIALS FOR NON-BEARING PARTITIONS IN TYPES I, II, III, AND IV BUILDINGS **SHALL** BE RESTRICTED TO NONCOMBUSTIBLE MATERIALS EXCEPT THAT FRAMING MEMBERS OF FIRE-RETARDANT TREATED WOOD MAY BE USED.

[*] WHERE THE SBC ALLOWS THE USE OF FIRE-RETARDANT TREATED WOOD, EXTREME CAUTION SHOULD BE EXERCISED IN SPECIFYING THE TYPE OF TREATMENT TO PREVENT DETERIORATION OF FASTENERS OR ATTACHED MATERIALS.

Type V**	For storage or service buildings, and public toilet facilities and/or concession stands related to athletic stadiums or like facilities.
Type VI**	For one-story buildings serving as district administration offices, or press boxes related to athletic stadiums.

** TYPES V AND VI BUILDINGS **SHALL** BE SEPARATED FROM ALL OTHER STRUCTURES BY A MINIMUM OF 30 FEET EXCEPT IN THE CASE OF PRESS BOXES

4. **Board of Adjustment and Appeals**

   a. There **shall** be a Board of Adjustment and Appeals constituted to hear appeals concerning matters related to codes and standards. The general structure, operating procedures, and powers of this board **shall** be in accord with SBC Sections 111, 112, and 113.

   b. Where the SBC Sections refer to the "Chief Appointing Authority" and to the "Building Official," this **shall** be construed to mean the State Superintendent of Education and the Director of the Office of School Planning and Building, respectively.

1.08 SOUTH CAROLINA OSHA STANDARDS

1. Section 41-15-210, *Code of Laws of South Carolina, 1976*, gives the Commissioner of the South Carolina Department of Labor the authority to promulgate, modify, or revoke rules or regulations for the purpose of attaining the highest possible degree of health and safety protection for all working persons in the state, whether employed in the public or private sector. Such rules and regulations affect all employers and employees of those engaged in the design, construction, or utilization of public school facilities, including architects, engineers, contractors, subcontractors, and school district personnel.

2. In regard to the design and construction of public schools, there are two separate sets of OSHA standards.

   a. General Industry Standards: This includes the design standards.

   b. Construction Standards: This includes the standards for actual construction or renovation operations.

3. The OSP&B **shall not** be responsible for reviewing construction documents or monitoring construction operations as to conformance with the preceding OSHA standards. Rather, this responsibility for compliance **shall** be incumbent upon the architect, contractor, and subcontractors as their respective interests occur.

4. For further information, contact the Assistant Director of Technical Support, Division of Occupational Safety and Health, South Carolina Department of Labor, P. O. Box 11329, Columbia, South Carolina 29211.

1.09 DHEC STANDARDS

1. Section 44-1-140, *Code of Laws of South Carolina, 1976*, gives the Department of Health and Environmental Control authority to adopt policies, rules, and regulations in connection with the furtherance of public health.

2. In reference to the design, construction, and maintenance of public schools, DHEC has set forth its requirements in this regard in Regulation 61-42 entitled "Sanitation of Schools, South Carolina Department of Health and Environmental Control."

1.10 FOR SCHOOL ADMINISTRATORS

The following area some general recommendations to school administrators whose particular district may be contemplating a building program.

1. **Selection of Architectural and/or Construction Management Firms**

a. The Model Procurement Code, enacted by the South Carolina Legislature and signed into law on July 30, 1981, prescribes the procedures for obtaining the professional services of an architect or construction manager for construction projects.

b. At this time (1982), the requirements of the Model Procurement Code do **not** apply to school districts. However, the OSP&B recommends that the Procurement Code procedures nevertheless be followed in the selection of either of these professionals.

2. **Legal Agreements for Professional Services and Construction Contracts as They Relate to the Construction Documents**

a. It is recommended that all agreements and the construction documents be coordinated between the district, architect, engineers, construction manager, and contractor.

b. Design services for the construction or renovation of a building require well-defined agreements between owner and architect, and between owner and contractor. Construction documents include and refer to standard documents, such as the general conditions, which are in harmony with the above-referenced agreements.

The American Institute of Architects (AIA) has developed standard forms of agreement and construction document forms which include:

Owner/Architect Agreement
Owner/Contractor Agreement
Owner/CM Agreement
Instructions to Bidders
General Conditions of the Contract for Construction
Application and Certificate for Payment
Affidavit Forms
Bond Forms. . . .and many additional supporting documents

c. The AIA documents are well coordinated regarding the responsibilities of owner, architect, and contractor, and the OSP&B recommends the use of these documents. However, if a district feels the need to modify any portion of these documents or to prepare their own documents, it should be done only with legal assistance.

3. **Educational Specifications**

a. Before any building program is begun, it is recommended that the district prepare written educational specifications for the architect as a program guide in the design of the building.

Architects should not be expected to be experts in the field of education per se, and they need detailed information about a district's educational philosophy, concepts, and requirements. This should include a discussion of desired space relationships, a tabulation of instructional and ancillary spaces, along with square foot sizes, equipment to be included, and other detailed information as may be necessary. A monetary budget should be arrived at jointly between the district and the architect based on the architect's knowledge of current building costs.

b. Educational specifications may be prepared either by a professional educational consultant from the outside or, in probably the majority of the cases, they may be prepared "in house" by district personnel.

Educational consultants, of course, are specialists in the field, and their services often extend beyond a single project to encompass long-range district planning and other comprehensive matters.

Whatever the source of preparation, teachers in particular, plus parents' organizations and even civic groups, should be involved through a structure of committees to help prepare educational specifications. When "users" are involved in facility planning, a higher degree of acceptance and satisfaction among teachers and students usually results.

4. **Reuse of Plans** ("Stock Plans")

a. The idea of so-called stock plans for school use on a statewide level has been considered at one time or another in South Carolina and in many other states. However, the general concensus is that it is a counterproductive process and saves little if any public funds. There are many factors involved which space here does not permit a detailed discussion of, but it is sufficient to say that the stock plan procedure was tried as far back as the 1940's and 1950's by at least 15 states but was subsequently abandoned by all. Today, to knowledge, no state uses stock plans except for temporary buildings.

b. On an individual district basis, there have been successful cases where a particular school has been duplicated either as part of a single building program, or a second school built within a fairly short time span after the original. In these cases, the enrollments were the same, the type sites were generally similar, and the educational concepts and needs were the same.

However, even in duplicating a single building, the belief that most of the architect's fee will be saved on the second building is incorrect, as professional services are still required for the following.

- Site adaptation of drawings and specifications is always required due to different utility requirements, soil conditions, site contours, and the transportation elements of a new site.
- Submittal of drawings and specifications to OSP&B for re-review is always required to check site adaptation, any possible changes ordered by the district, and any changes in the building codes or regulations since a prior review.
- Complete services to handle the bidding and award phase of the work.
- Complete services during the construction phase of the work.

Since the architect still has the same professional responsibility for each repeated building and in view of the preceding required services, the savings to the district will probably not exceed 15-35 percent of a normal full fee, and this is a rather minor savings in overall project cost.

There can be distinct disadvantages in some cases to the reuse of plans if there has been a rather lengthy time lapse since the plans were first prepared, as expensive changes may be required due to building code changes, building technology may have advanced (particularly in the area of lighting, and heating and cooling), the economics of one structural system versus another may have changed, and so on. As is the case with education, the art of building design and construction is in a constant state of slow evolution.

5. **Component Metal Buildings**

   a. As used herein, the definition of a component metal building is construed to refer to what is normally a clear-span structure with pitched roof, metal sidewalls, metal roof, and one that is most often associated with open areas for storage or industrial use.

   b. The use of such metal component buildings described above is not recommended for student-occupied facilities, but if used, all building code requirements and all requirements of this guide **shall** be met, including use of complete professional services as outlined in Section 1.06.

   c. There is often the misconception that the use of this type of structure will greatly reduce building costs, but experience belays this and savings have proven to be neglible to very modest, at best, when all materials and systems involved are of equal quality with those of traditional structures.

   d. Disadvantages to this type of structure include appearance, possibility of damage to metal sidewalls, noise distraction of rain on metal, and difficulty in meeting energy conservation standards.

6. **Life Cycle Energy Study**

   a. In view of the alarming rise of utility costs and also costs of building maintenance expected in the years ahead, it is strongly recommended that the services of a mechanical engineer (in conjunction with the architect, electrical engineer, and/or construction manager) be utilized to provide a computerized "life cycle cost analysis" in the early design stage for all new buildings and for major additions or renovations to existing buildings.

   b. Such a study should include several alternate integrated studies of construction costs and materials, building orientation, lighting, usage schedules, fuel alternates, mechanical equipment, maintenance costs, and any other factors affecting the long-term operating costs of a building as compared to the initial construction cost.

   c. Such a study would require additional fees above the normal design fee paid by the architect to his mechanical engineer, but such additional costs would be minimal compared to the potential savings to the district over the normally expected 50- to 60-year life span of a typical school.

   d. Refer to Section 11.10 also.

2.01 INDEX OF SECTIONS INCLUDED IN THIS DIVISION

Section Number and Title		Page	Section Number and Title		Page
2.02	Definitions	2-1	2.06	Site Selection Factors	2-2
2.03	Site Approval	2-1	2.07	Site Development	2-3
2.04	New School Sites	2-2			
2.05	Existing Sites Related to Building Additions	2-2			

2.02 DEFINITIONS

1. Refer to definitions under Section 1.03, Items 1 through 9. Note in particular the paragraph concerning mandates vs. recommendations.

2.03 SITE APPROVAL

1. **Subject to Approval Before Acquisition**

   a. Except as noted under Paragraph b below, all real property subject to acquisition by a district, whether unimproved land or land with existing improvements, **shall** first be approved by OSP&B. All property **shall** be acquired in fee simple title as per state statute.

   b. Approval by OSP&B is not required before acquisition of property when **both** of the following conditions occur.

   - The property is to be used for non-student-related purposes (such as for administration, maintenance, or storage buildings).
   - No state funds are to be used in the purchase of the property.

2. **On-site Inspection Before Acquisition**

   a. At discretion of OSP&B, site inspections may be made of any property where approval by OSP&B is required before acquisition.

   b. If boundary plat of property is available, same **shall** be furnished to OSP&B at time of inspection. If plat is not available, corner irons should be identifiable.

   c. At discretion of OSP&B, any of the following may be asked to participate in a site inspection in addition to district personnel.

   Architect, landscape architect, professional engineer, or construction manager
   DHEC District Engineer
   Department of Highways and Public Transportation Traffic Engineer
   Local or Regional Planning Agency
   Soil Conservation Service

3. **Written Approval Before Acquisition**

   a. In all cases where OSP&B approval is required, after tentative approval of site by OSP&B, district superintendent **shall** submit the form "Application for Approval of Property Acquisition" to OSP&B for final approval. A boundary plat prepared by a registered land surveyor indicating acreage, bounds, adjoining roads, and other pertinent information, **shall** be attached to form.

   b. See DIVISION 13—SAMPLE FORMS for copy of above form.

2.04 NEW SCHOOL SITES

1. **Minimum Sizes**: The following **shall** be minimum and mandatory.

Type of School	Basic Number of Acres Required	Additional Acres Required Above Basic Acreage
Elementary	10	Plus 1 acre per 100 students, based on maximum projected enrollment
Middle	20	same as above
Junior High	20	same as above
Senior High	30	same as above
Vocational Center	10	same as above

2. **Two Schools on a Single Site**

   Where a district intends to build two schools on a single site, it is permissible to reduce the total combined required independent acreage by 15 percent, based only on the following groupings, unless waived by OSP&B.

   Elementary/Middle
   Middle/Junior High
   Junior High/Senior High
   Senior High/Vocational Center

3. Minimum sizes **shall** consist of "all-usable" acres.

4. If a proposed site fails to meet above minimum size criteria, written request for waiver may be made by the district to the State Board of Education through OSP&B. Reasons for request must be fully documented.

5. Where an on-site sewage disposal system will apparently require substantial additional land (such as for an irrigated spray field), the minimum site size **shall** be increased by the additional acreage required for this.

2.05 EXISTING SITES RELATED TO BUILDING ADDITIONS

1. Where building additions to existing schools are contemplated and the site size does not meet the criteria listed in Section 2.04, Item 1, the school district should make every reasonable effort to purchase additional land to meet, or more nearly meet, above requirements.

2. Where the site does not meet size criteria and additional land is unavailable, OSP&B **shall** make a judgment decision as to permission for further building additions on the site, based on existing site acreage vs. size of addition, increase in enrollment, sewage and water considerations, and other related factors.

2.06 SITE SELECTION FACTORS

1. The district, after careful consideration of all factors, will select the tentative site for inspection by OSP&B. In some cases, more than one site may be considered and a comparative evaluation made jointly by the district and OSP&B before final selection.

2. The school district when considering sites may wish to enlist the aid of any of the following.

   Architect, landscape architect, professional engineer, or construction manager
   DHEC District Engineer
   Department of Highways and Public Transportation Traffic Engineer
   Local or Regional Planning Agency
   Soil Conservation Service

3. If OSP&B has tentatively approved a site that does not have access to an approved municipal or county water and/or sewage system, or if soil conditions are questionable, it is recommended that an "option to purchase" be secured, in order that proper engineering studies might be first obtained to assure that problems related to the above factors will not be encountered later.

4. **Miscellaneous Factors**

   a. Location: Should be near student population center with consideration given to growth direction.

   b. Shape: A rectangular shape is generally preferable, with an approximate ratio of 5:8 considered ideal. Avoid long, narrow sites.

   c. Topography: Avoid steep slopes and excessive "cut and fill" situations where possible.

   d. Access: Consider highway access, width of roads, and future development patterns. Avoid congested traffic areas. Especially important is consideration of "sight lines" on main road frontage where cars and busses enter traffic. Main road frontage should be ample to allow for separate car and bus entrances and exits.

   e. Noise: Area should be free of disturbing noises resulting from high-speed vehicular traffic, airport approaches, shopping centers, industrial plants, and the like.

   f. Utilities and Services: Consider availability of water, sewer, gas, telephone, electricity, and fire/police protection.

   g. Soil Conditions: Soil investigations, such as borings or percolation tests, are recommended prior to site acquisition.

   h. Easements: Give prior consideration to type and location of easements that may be inherent with the property.

   i. High-Tension Transmission Power Lines: These **shall not** cross any portion of a school site, unless otherwise waived by OSP&B.

2.07 SITE DEVELOPMENT

1. In laying out bus parking areas, backing-up of busses **shall not** be permitted under any circumstances.

2. In laying out bus and auto traffic patterns, discharge or pick-up of students at loading/unloading zones **shall** always be from the side of the vehicle opposite the driver and towards the building.

3. Each parking bay for full-sized busses **shall** be a minimum of 15' wide. Smaller spaces may be provided for mini-busses and other specially sized vehicles used to transport students.

4. Other site development factors will be included in DIVISION 3—DESIGN CRITERIA.

3.01 INDEX OF SECTIONS INCLUDED IN THIS DIVISION

Section Number and Title		Page
3.02	Definitions	3-1
3.03	Administrative Area	3-1
3.04	Guidance	3-2
3.05	Records Room/Vault	3-3
3.06	Health Units	3-4
3.07	Kindergartens	3-5
3.08	General Classrooms	3-19
3.09	Special Education	3-24
3.10	Media Centers	3-26
3.11	Teachers' Lounges	3-29
3.12	Bookrooms	3-30
3.13	Toilet Facilities	3-32
3.14	Storage/Custodial Facilities	3-37
3.15	Mechanical/Electrical Rooms	3-39
3.16	Corridors	3-41
3.17	Stairways	3-43
3.18	"Interior" Classrooms	3-43
3.19	Finish Ceiling Heights	3-44
3.20	Entrances	3-45
3.21	Covered Loading/Unloading	3-45
3.22	Doors	3-46
3.23	Windows	3-49
3.24	Lockers	3-51
3.25	Vocational Facilities	3-52

Section Number and Title Page

FUTURE SECTIONS TO BE ISSUED

Site Development
Art
Driver Training
Gymnasiums
Cafeterias
Kitchens
Music
Science

3.02 DEFINITIONS

1. Refer to definitions under Section 1.03, Items 1 through 9. Note in particular the paragraph concerning mandates vs. recommendations.

3.03 ADMINISTRATIVE AREA

1. **Reception/Waiting**: For students, parents, and the public. An area of 160-175 sq. ft. may suffice in small schools, while larger schools may need several times that amount. This area is usually separated from the office work area by a counter/cabinet.

2. **Office Work Area**

   a. This area is the hub of the administrative complex. The health unit should open directly from it, the records room/vault should be close by. Traffic to the principal's office is controlled from this point.

   b. The number of personnel to be accommodated will of course vary in proportion to the size of the school—from one in a small school to several in a large school. Provide desk space for each person, in addition to file cabinets, PA system console, and any other items directed by district.

   c. In this general area should be placed a system of "mail boxes" for teachers in which mail, notices, and other communiques can be placed for pick-up; determine size, depth, and other details from district. A back entrance for teachers is very desirable so they do not have to come through the main waiting area.

3. **Workroom**: Establish if this is to be a workroom for just the administrative area or if it is to serve as a workroom for all teachers as well. The former might need 75-100 sq. ft.,

while the latter would need two or three times that. An ample work counter with sink is needed, with hot and cold water; it is desirable to provide kneehole space below sink for wheelchair access.

4. **Principal's Office**

   a. Sizes usually run from 160-275 sq. ft. depending on the number of people to be seated at one time (the location of a small conference room nearby would normally lessen the need for a particularly large principal's office).

   b. If at all possible, a second exit leading directly into a building corridor should be provided from the principal's office so that he is not forced to pass through the main waiting area at all times.

   c. Amenities sometimes included with the principal's office are a private toilet and a coat/storage closet.

   d. Attempt to locate the principal's office so that traffic through the office work area is minimized.

5. **Assistant Principals**: In larger schools there may be one or more assistant principals, and there is diverse thought as to where their offices are best located. One opinion is to place them in the main administrative area along with the principal, while another opinion favors locating them at separate strategic points around a building to help promote discipline. In any case, an area of 150-160 sq. ft. is usually sufficient.

6. **Conference Room**: It is desirable to have this in conjunction with the guidance suite so that it is available for general school use, as well as for small group counseling. It should seat a minimum of 12 persons.

7. **Storage**: Provide ample storage for office supplies.

8. See separate sections for discussion of guidance suite, vault/records room, and health unit.

3.04 GUIDANCE

1. **General**

   a. Guidance counselors are mandated for all secondary schools in proportion to the enrollment; they are also provided for elementary schools under certain circumstances and it is probably wise to incorporate guidance facilities in all new elementary schools to allow for this contingency.

   b. The district should instruct the architect as to the number of guidance personnel to design for. Growth potential of the school should also be taken into consideration when providing private offices for counselors.

2. **Location**

   a. The guidance suite should be near the main building entrance for convenience of parents, college or employment recruiters, district staff, and others involved in the counseling function. Should be either adjacent to the school administrative area or in close proximity thereto, but in any case, the guidance suite should have its own separate entrance from a corridor or lobby.

   b. Should be in convenient proximity to the records room/vault.

3. **Guidance Layout**

a. Reception/Waiting Area

- In elementary schools, this area may double as a waiting area and a small group counseling room for as many as 12 students at one time. An area of 200-225 sq. ft. is recommended.

- In secondary schools, allow for a receptionist's desk, lounge furniture, chairs, and equipment for display material. An area of 250-400 sq. ft. is recommended.

- Provide a private telephone line into the receptionist/waiting area with extensions to each counselor's office.

- Recommend a 4' high x 6' long tackboard.

b. Storage: Allow ample storage for guidance material of various sorts (games, AV equipment, filmstrips, printed material, etc.). The storage area should open to reception/waiting area and may be a walk-in closet or wall cabinets.

c. Conference Room: This is recommended for secondary schools, and should seat 12 students at a table for conferences and small group guidance. Desirable to open to administrative area as well as guidance suite in order to serve the school for other conference purposes (see Section 3.03, Item 6). Recommend chalkboard and tackboard.

d. Counselor Offices

- Each counselor needs a private office of approximately 150 sq. ft. Allow for desk and as many as five people (including counselor) plus four-drawer file cabinet and bookcase.

- Where feasible, exits from each counseling office to a corridor are considered ideal so that students or parents do not have to pass back through the reception area to leave.

e. Toilet Room: Should be provided for in all guidance suites. Some counseling sessions may evoke deep emotional reactions, either from a student or parents, and it is highly desirable to have toilet facilities within the immediate area. It should consist of a water closet and lavatory and normal accessories. It may be feasible to locate the toilet room so that it is also accessible to the main administrative area, including the principal, thereby serving multiple purposes.

3.05 RECORDS ROOM/VAULT

1. **General**

a. The primary purpose of this area is for preservation and storage of student records, including protection from fire, theft, and vandalism.

b. Records follow a student from elementary to middle, to junior high and thence to senior high school, at which place they will be kept permanently unless the district has a central records storage or a system of microfilm retention.

c. Records room/vaults are not mandated by the Defined Minimum Program per se, but protection of records against fire **is** mandated.

2. **Location**: Should be in the administrative area and under the direct control of the administrative personnel. However, it is most important for the area to be convenient to guidance counselors also (see Section 3.04, Item 2, Paragraph b).

3. **Size**

   a. Student records are generally kept in four-drawer legal-sized file cabinets. One cabinet can normally hold 300-350 student records. The district should establish the number of cabinets needed.

   b. In addition to file cabinets, allow space for a 30" x 72" table and two chairs (it is much preferable to do record work directly in the area rather than removing records to an outer office).

4. **Construction**

   a. **Shall** be 4-hour rated masonry walls with 4-hour reinforced concrete slab ceiling or other 4-hour rated ceiling assembly.

   b. Door(s) **shall** be 3-hour Class A metal flush type if district desires a door closer, or the equivalence of 3-hour construction if a door closer is not desired. A "vault type" door with combination lock is not normally recommended.

   c. Height may be as low as 7'-8".

   d. Install two electric receptacles on wall away from file cabinets and provide lighting intensity the same as that of offices.

3.06 HEALTH UNITS

1. **General**: Health units are not mandated by the Defined Minimum Program, but their inclusion is strongly recommended.

2. **Purpose**

   a. As an emergency center for the administration of first aid, for the care of those becoming ill, or for the isolation of those with suspected communicable diseases until they can return to class or be placed under parents' care.

   b. As a place for those requiring a rest period upon physician's recommendation, or otherwise.

   c. As a place where screening procedures can be carried out and where individual health counselling can be done.

3. **Location**: Should normally be a part of the school administrative area so that close supervision of the unit can be maintained by the office personnel (comparatively few schools have full-time nurses). There should be direct access from the main administrative work area into the health unit. The entire unit should be capable of being locked for security.

4. The health unit should include a waiting area, work area, cot area(s), and toilet room(s). In more elaborate units, a separate conference room or storage room may also be included at the district's option.

   a. Waiting Area: At the district's option, this may be combined with the work area in smaller schools or students may wait in adjoining administrative area. Allow for as many as two or three students at one time in smaller schools, four or five in larger schools.

   b. Work Area

      - Recommend a floor area of 150-300 sq. ft., depending on size and type of school, whether waiting and work areas are combined, whether cots will be in work area, etc.

- A 2' wide base cabinet unit with a countertop and single sink should be provided; sink should have hot and cold water with lever arm wrist controls. Base unit should be a minimum of 4' to 5' long.

- Recommend 12" wide upper wall storage cabinets over base cabinet for additional storage.

- Recommend space for a 4' desk, chair, file cabinet, and small apartment-sized refrigerator (or refrigerator may be incorporated as an under-counter unit in the base cabinet if desired).

- Provide adequate electrical receptacles, telephone outlet, and a 4' x 4' tackboard. Allow for storage of linen, blankets, other supplies, and any special equipment as directed by district.

c. Cot Area(s)

- In elementary schools, one cot space may be satisfactory for small schools while two may be needed for larger schools. May be in the work area with curtain for privacy, or may be in a separate room, at the district's option. If in a separate room, follow the same criteria for the toilet and lavatory as mandated for secondary schools below.

- In secondary schools, there should be at least two cot spaces for girls and one for boys, as a minimum. Cot rooms should be separated by sex, and each should be connected by a doorway to the workroom. It is desirable to have the cot areas equipped with hospital-type curtain dividers; a minimum of 3' is recommended between cots. An individual toilet room should open directly from each cot room; it is recommended that a wall-hung lavatory with hot and cold water be installed on the wall of each cot room near the door to the toilet room.

d. Toilet Room(s)

- A water closet only is recommended if the toilet room opens from a cot room where a lavatory is located. Otherwise, the w.c. and lavatory should be together if the toilet room opens directly off the work area (in case of elementary school without separate cot room).

- Should be equipped to serve a wheelchair and be 3'0" x 6'0" in size if w.c. only, or 5'0" x 7'0" if w.c. and lavatory are used.

3.07 KINDERGARTENS

1. Kindergarten Structure

a. Number of Sessions: The large majority of kindergartens operate on a double-session schedule. First-session children arrive in the morning at the same time as the elementary students and are in the kindergarten program for approximately three hours; after dismissal and a short interlude, second-session children arrive for the afternoon program and dismiss at the same time as the remainder of the school. A single-session kindergarten has the same hours as the elementary students. There should be no difference in the physical facilities or design of the kindergarten, however, whether it is for double- or single-session units.

b. Staff: Each kindergarten unit is staffed by a certified teacher and an aide.

c. Enrollment: Enrollment per unit, per session, will normally range from 20 to 30 children (30 is the maximum).

d. Nourishment: Due to the shortened schedule of the double-session program, most kindergarten children do not eat lunch in the school cafeteria, but are served light snacks prepared within the kindergarten unit itself.

e. Transportation: Kindergarten children may walk to school, may be brought by parents, or may be transported on the same busses as other students.

2. **Location of Kindergarten Units**

a. Kindergarten units should be constructed as an integral part of the elementary school rather than as a separate facility in order that kindergarten teachers might have interaction with the primary grade teachers, and also for building and site economics. The kindergarten units should normally be located adjoining the area of the first-grade classrooms. Kindergartens are active areas with higher-than-average noise levels and proper sound stoppage should be provided between classrooms.

b. Where multiple kindergarten units occur within a school, they should be grouped adjacent to each other for teacher and class interaction and for optimal use of common facilities, such as the teachers' work area, some materials and equipment, play yard, etc.

c. In locating kindergarten units in a design, always consider the need for possible future expansion due to a higher percentage of participation in the kindergarten program, or to the conversion of the program to a single session, or to the need to expand the entire school due to population growth.

d. Since it is critical to locate the kindergarten units adjacent to each other for the reasons stated above, one possible approach where a future expansion is anticipated is to build an additional unit initially and use it during the interim for some other classroom purpose, such as for special education or a first grade, which could then be relocated to some other area in the future.

e. Kindergartens **shall** be located on the ground-floor level.

f. It is strongly recommended that vehicular traffic at all schools be separated by individual bus and automobile drives. The kindergartens would ideally be located in a common area near the drop-off points for both busses and parents' cars. In any case, always avoid locating kindergarten units in a part of the building that is remote from the vehicular drop-off points.

g. It is recommended that exterior walks extend from drop-off areas through the outside play yard to the door of each kindergarten unit. The child would normally enter and leave the kindergarten by this exterior route and it is preferred that they not use the main corridors of the building unless necessary during inclement weather.

h. See pages 3-13 and 3-14 for illustrations.

3. **Kindergarten Classrooms**

a. Floor area **shall** be one of two options as follows.

- A minimum of 1,050 sq. ft. if separate teacher's work area is provided (see Item 5 hereafter).
- Or, if no teacher's work area is provided, a minimum of 1,100 sq. ft., plus walk-in storage closet or comparable wall storage cabinets, minimum of 2' deep.

b. The floor area mandated above **shall** be clear, open area exclusive of toilet room or teacher's work area. However, the area covered with mandated cabinetry and the area used to recess an out-swinging entrance door to a corridor, to the extent of 16 sq. ft. for one door, may be included within the minimum areas stipulated above.

c. Width **shall** be minimum of 24' except that pod-type designs are permissible.

d. Work Counter and Food Preparation Center

- Each classroom **shall** have a work counter and food preparation center equipped with a minimum of one sink and with two sinks recommended (note from Item 4 hereafter that lavatory in toilet area may be omitted if second counter sink is installed). Minimum length of counter **shall** be 12', with 15'-16' recommended. Height 2'-1" to countertop.

- Sink(s) **shall** be stainless steel or porcelain, located at opposite ends of the counter if two sinks are used. For art and general activities, use a standard "classroom" sink with gooseneck fitting on one side and drinking bubbler on other; recommend cold water only. For food preparation center, use a kitchen-type sink with swing faucet and hot and cold water; recommend "instant-flow point-of-use" water heater attachment below sink, or conventional hot water heater may be provided elsewhere (dishes and utensils are normally only rinsed and then sent to the school kitchen for washing).

- Locate sinks as close to front of cabinet as possible for accessibility to students.

- Recommend base cabinets below all counters, to be partially open and partially closed. Allow for flat storage of painting paper in open portion; majority of this will be 18" x 24" but 24" x 36" size may also be needed.

- Recommend 12" deep upper wall cabinets at adult level over the entire counter area for general storage. If budget permits, cabinets may extend to the ceiling for additional storage.

- Recommend upright utility-type cabinet minimum of 2'-0" wide for storage of brooms, mops, and cleaning materials. (While the utility cabinet fits well into the work counter area, it may nevertheless be located anywhere in the room.) There are times when emergency cleaning is necessary that cannot wait on the custodian; also the children often participate in day-to-day cleaning operations. Part of the cabinet may be designed for teachers' coat hanging or with general storage shelving.

- Recommend paper towel dispenser in vicinity of each sink, placed within access of students.

- The food center in addition to the recommended sink should be equipped with the following.

  Upright apartment-sized refrigerator (approximately 9 or 10 cu. ft.) with freezer compartment, placed at end of counter.

  Portable two-burner hot plate and portable countertop oven (both normally stored when not in use).

- See page 3-18 for design details.

e. Student Storage Units

- Open storage units, known as "cubbies," should be provided for student's coats, hats, and overshoes, and also as a place for items that the student may be bringing from, or taking home such as books, artwork, notes to parents, etc.

- The cubby units are typically 4'0" long by 4'0" high and are divided into four coat-hanging compartments with two storage cubicles above each coat space. Due to space and economic limitations, two children in the same session will use one coat space (with separate coat hooks) but each will have his own storage cubicle. Each cubby unit will, therefore, accommodate eight children in each session, which means that four individual units would be required to serve one kindergarten if maximum enrollment is expected.

- Cubby units are designed to be portable and should not be attached to the floor or wall, so that the teacher might have flexibility in forming area dividers or making any other desired arrangement.

- See page 3-17 for suggested fabrications details.

f. Windows

- In addition to an exterior door leading to the play yard, a somewhat generous glass area is recommended to overlook the play yard to promote an indoor/outdoor atmosphere and to give children the opportunity to observe the outdoors and the change of seasons, and to help create a total learning environment.

- The ideal kindergarten program schedule will include an indoor/outdoor "flow" of activities at work time, with some children involved indoors while others are outside. Children are always supervised by the teacher or aide at either location, but a reasonable glass area gives the teacher better visual control of the entire program.

- It is desirable to extend the glass to within approximately 2'-0" above the floor. Excessive sunlight might be restricted by means of orientation or roof overhang, although the design should allow for installation of blinds or shades to darken room for audiovisual presentations.

g. Flooring

- Approximately 30-35 percent of the floor area should be covered with resilient flooring or other easily cleanable finish, and this should adjoin the work and food preparation counter to form a "wet" area for the art and snack preparation activities and should be extended, if possible, to include the area of the exterior door to the play yard. Roll-type resilient flooring has the advantage of a minimum amount of jointing.

- The remaining 65-70 percent of the floor area should be carpeted with a low-pile, high-density type carpet. See Section 7.08.

h. Fixed Chalkboard: None is recommended except possibly on the back of alternate cubby units, as detailed.

i. Tackboard and Tackstrips

- One 4' x 6' tackboard unit for the teacher **shall** be installed where directed, with bottom of board 29" from floor.

- Two levels of tackstrip continuous on all available major walls **shall** be installed; bottom strip at 2'-10" from floor, top strip at 4'-10".

- Other tackboard may be put on backs of alternate cubby units, as detailed.

j. Mirror: 24" x 48" wall mirror should be mounted vertically with the bottom 8" from floor. Usually placed near door to toilet area or to corridor.

4. **Individual Classroom Toilets**

a. Two toilet rooms (one for boys, one for girls) are recommended for each classroom, although one, serving as a unisex arrangement, **shall** be required as a minimum.

b. Each toilet room **shall** have a water closet and lavatory, or at the district's option, the lavatory may be omitted if the work counter is equipped with two sinks and if the general activities sink is in close proximity to the toilet room door. See DIVISION 10—PLUMBING for water closet type and lavatory mounting height.

c. It is recommended that toilets be large enough for a teacher to be in the compartment to assist a student if necessary. Doors need not be over 2'-4" wide and it is preferred that they swing in. Set door hardware at 2'-8" from floor.

d. Individual toilet rooms are not required to accommodate the physically handicapped, provided a handicapped facility (in either a student gang toilet, or teacher or public toilet) is located within 200' of the classroom door.

e. The following accessories are recommended.

- Toilet paper holder, paper towel holder (if lavatory is included), and coat hook on door (at 4'-6" high).
- Mirror 16" x 24"; furnish only if lavatory included with w.c. (bottom at 2'-4" from floor; mount on side wall).

5. **Teachers' Work Area**

a. Purpose: For teachers' office and workroom, for testing children, for conferring with parents, for parents' observation of their children, and for storage of equipment and supplies. One work area would normally serve two kindergarten classrooms.

b. Size: Recommend 110-115 sq. ft. for a single kindergarten unit, or 180-200 sq. ft. for two units. Each teacher should have space for a four-drawer file cabinet, two chairs, and a small desk or work counter; provide double coat hook on doors.

c. View Windows: To overlook classroom. One-way mirrored glass is recommended so that children can be observed in private by parents, school psychologist, or nurse.

d. Floor: Carpet preferred.

e. Storage Shelving: Approximately 8-10 lin. ft., floor to ceiling, for single kindergarten units, or 14-16 lin. ft. for two units. Approximately two thirds of the shelving should be 16" deep and the remaining one-third 24" deep. It is desirable that all shelving be adjustable. On the deep shelving, allow for 24" x 36" poster board to be stored flat.

6. **Electrical**: Recommend wall receptacles approximately 12'-15' o.c. in classroom (more receptacles are needed in a kindergarten for listening stations, filmstrip projectors, phonographs, fish aquarium, etc.). Also provide power for refrigerator and portable countertop hot plate and oven, and a general receptacle over counter away from sinks.

7. **Cooling/Heating**: A separate zone is suggested for possible summer operation if needed for some future program not now contemplated.

8. See page 3-16 for typical interior layout.

9. **Enclosed Play Yard**

a. Recommend Sizes

- A minimum of 2,750 sq. ft. for one kindergarten
- A minimum of 4,300 sq. ft. for two kindergartens
- Add 1,400 sq. ft. for each unit over two

b. Recommended Enclosure

- Chain-link fencing may be used for the enclosure although it is suggested that the height be kept at 4' to avoid a "compound" appearance. Some measure of privacy and noise abatement can be attained by planting a thick hedge around the outside of the fence.
- As an option, a wall enclosure of masonry or pressure-treated wood or the combination of the two may be used where a better architectural effect is desired; a

height of 5'-6" should be sufficient. The privacy of a wall is often desirable from a standpoint of noise abatement, as well as a sight barrier, although the resulting privacy of the play yard may sometimes invite the curiosity of older students.

- Another option would be the combination of the above materials; i.e., use of walls where screening and noise abatement are desired from a driveway, street, or other classrooms, and use of chain-link fencing on a side where more openness is desired.

- A pedestrian gate and a sidewalk previously mentioned should be provided for the children's normal traffic flow to and from their transportation drop-off point. Consider access requirements for placing or replacing larger playground equipment, sand for sand box, etc.

10. **Covered Play Area**

a. Purpose: Serves as a refuge from hot sun and also as a limited play area during inclement weather. Not mandatory, but very desirable.

b. Size: 225 to 300 sq. ft. recommended for each kindergarten unit.

c. Floor: Concrete, sloped to shed water.

d. Roof: Most logically formed by extending the main roof of the building.

11. **Play Yard Storage Room**

a. Purpose: For storage of play yard items such as tricycles, wagons, balls, and other playground equipment.

b. Location: Preferably part of the main building, with the door opening to the play yard. A separate low building on one side of the play yard area would serve also. Recommend one central storage room regardless of the number of kindergarten units.

c. Size: Recommend 60 sq. ft. for one kindergarten unit, 90 sq. ft. for two units.

d. Finishes: Concrete floor, unpainted masonry walls, ceiling optional.

e. Door: Recommend out-swinging 3'-0" wide single door. Provide hold-open hardware.

f. Shelving: Recommend unfinished plywood or particle board shelving on two or three walls, varying from 16" to 24" deep. Bottom shelf should be approximately 2'-4" above floor.

12. **Play Yard Layout**

a. Organization

- Imagination by the architect can be most fruitful in this area.

- In organizing the play yard, it is important to provide clear paths and adequate empty space. When a path is not clear, there is interference with a child's ability to see, move, or stay with an activity. Empty or open space is necessary to accommodate the large amount of active play, which takes about three times the space of passive play; from one-third to no more than one-half the play yard should be open area to accommodate space for running, riding, building, or whatever activity is taking place, as well as sufficient space to separate the various activities from each other.

- Another important factor is variety. How many different activities are provided for, and how many different kinds of equipment are there? What different types of play space are available—active, passive, fixed equipment, and area of improvisation? Will the spaces interest a child? Planning for variety insures that a child has an interesting choice and that the play yard will be used to potential.

b. Landscaping

- Landscaping should provide for some shade, in addition to open, sunny areas. One or more shade trees are highly desirable and should be planted as soon as the building is completed, if they are not already existent at the site.
- Some grassy areas are desirable.

c. Surfacing

- The surfaces of a play yard are like sign posts—they can give directions and designate certain activities. Open areas indicate running, game-playing, or improvisation; sand stimulates digging and building. Different activities obviously require different surfaces—a hard surface for cycling, a resilient surface under climbing apparatus or under "jumping off" areas.
- Concrete and asphalt are ideal for riding wheel toys. Since wheel items such as tricycles and wagons are favorites with children, a clearly defined "trike" path is recommended. This should be a one-way path approximately 7' or 8' wide that winds around in a free-form pattern through the play area to the surfacing under the covered play area of which it is an extension; this "road," by travelling through the play area, permits a free flow of activity. Asphalt is obviously less glary than concrete, but if it is used, it is suggested that it be edged with wood or metal edging strips.

d. Water

- Wall Hydrants: Minimum of one should be provided for a single kindergarten unit, two for a double unit.
- Location of the hydrants would be appropriate in several areas. Water should be available for several activities—gardening, sand, waterplay, art, and cleaning.

e. Outdoor Learning Centers

- Digging Area: An area should be set aside where children can dig in the dirt. This area would be separate from a planting area.
- Garden Area: An area for gardening should be provided where either vegetables or flowers may be planted. Food grown outside may be used indoors in the food preparation center.
- Sandbox: 150 to 175 sq. ft. is a recommended minimum size, in rectangular or free-form shape. The box may be placed in a sunny location for maximum drying benefits and may be bounded by treated lumber, old railroad ties or such. Subterranean drainage would be most desirable. Some type of polyethylene cover may need to be provided for animal control and to minimize the wet sand problem.
- Quiet Space: A quiet space needs to be provided for the child who wants to be alone. This area can be created as a natural environment with shrubbery or with wooden boxes, concrete culvert, or other imaginative means.
- Creative Building Area: An area where children may create with large blocks, or other creative materials such as boxes, barrels, and boards.
- Workbench: Outdoor space offers a very satisfactory location for working with tools. A workbench may be provided or the creative use of stumps might serve as a woodworking center.

- Water Play Area: An area set aside for playing with water is essential. Different containers such as buckets, large tubs, or a play table, etc. allow for a variety of water play activities. The container chosen would be determined by the purpose of the activity.

- Art Area: A center that provides a variety of materials. A table could be moved outside into this center on occasions or a small table made from treated wood could be a permanent piece of equipment.

f. Equipment

- Equipment should be provided to promote large muscle activities. Permanent playground equipment, such as tires or soft-seated swings, horizontal ladders, balance beams, pyramids, or other appropriate climbing apparatus, can of course be ordered from manufacturer's sources.

- Miscellaneous equipment such as balls and ropes should be available.

- Wheel Toys: Tricycles, wagons, etc. should be available. Institutional vehicles are recommended.

- Improvised or "do-it-yourself" outdoor play equipment:

  Each play yard can reflect the personality, ideas, and imagination of the adult in charge.

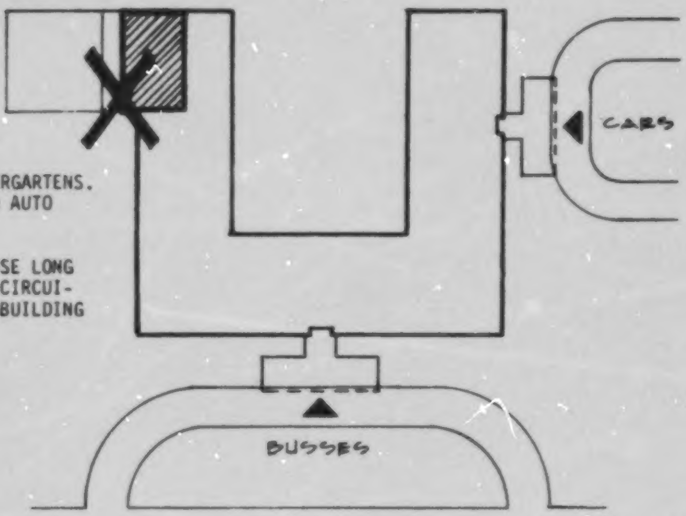
  Homemade and original equipment does more than just save money—it is usually more interesting and appropriate as the children can have an important part in its construction. Innovative equipment encourages children's natural curiosity and creativity and helps them develop new skills.

  Concrete culvert pipe, boxes, packing crates, saw horses and boards, electric cable spools, tree stumps, tires, railroad crossties—all can be used to equip successful play yards.

- See pages 3-15 and 3-16 for suggested play yard layouts.

13. **Basic Skills Section, Office of General Education, South Carolina Department of Education**

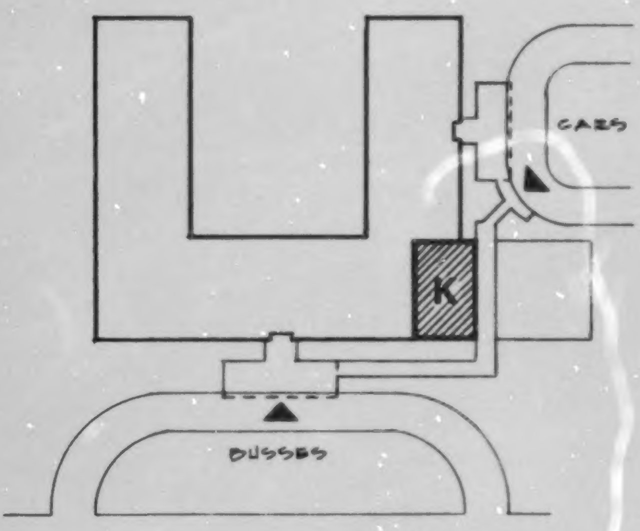
Call early childhood consultants in this office if further information is needed.



POOR LOCATION FOR KINDERGARTENS. TOO REMOTE FROM BUS AND AUTO DROP-OFF AREAS.

AVOID MAKING CHILDREN USE LONG INTERIOR CORRIDORS, OR CIRCUITOUS ROUTES AROUND THE BUILDING ON THE EXTERIOR.

ILLUSTRATES POOR LOCATION FOR KINDERGARTEN



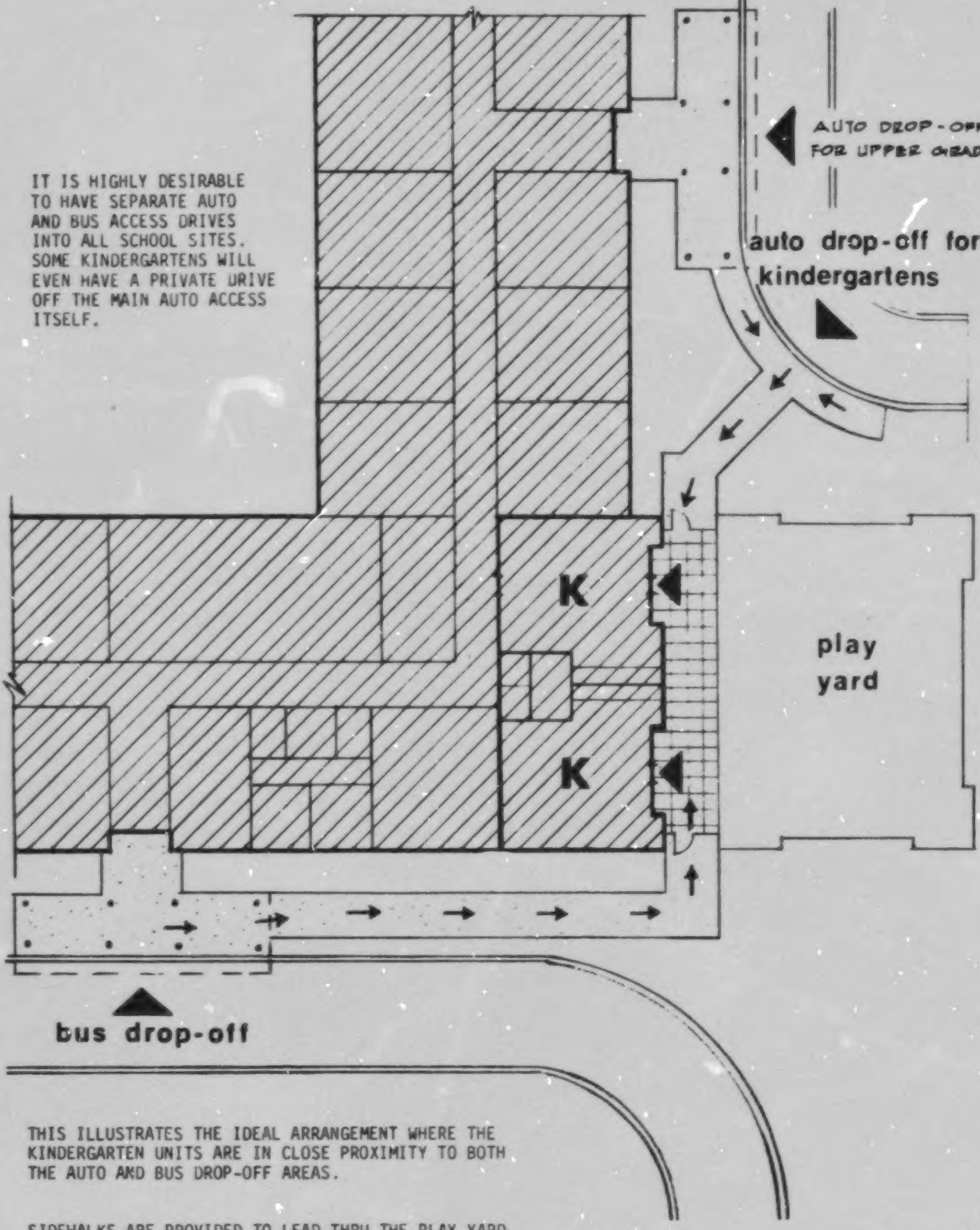
NO SCALE

VERY GOOD LOCATION FOR KINDERGARTENS. EQUALLY ACCESSIBLE FROM BOTH DROP-OFF AREAS.
CAN BE REACHED DIRECTLY FROM THE OUTSIDE WITHOUT GOING INTO THE BUILDING.

ILLUSTRATES EXCELLENT LOCATION FOR KINDERGARTEN

LOCATING THE KINDERGARTEN

IT IS HIGHLY DESIRABLE TO HAVE SEPARATE AUTO AND BUS ACCESS DRIVES INTO ALL SCHOOL SITES. SOME KINDERGARTENS WILL EVEN HAVE A PRIVATE DRIVE OFF THE MAIN AUTO ACCESS ITSELF.

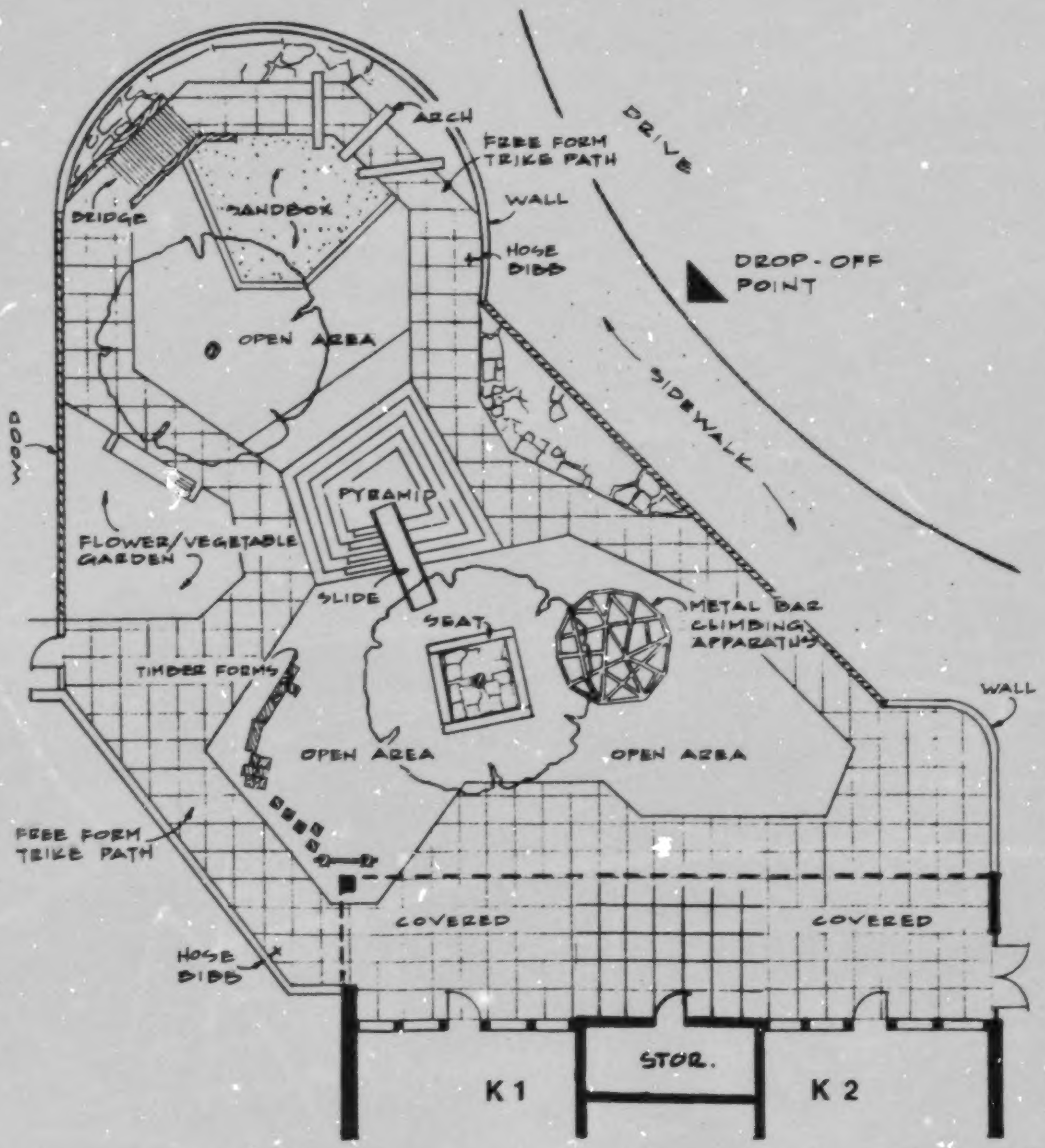

AUTO DROP-OFF FOR UPPER GRADES
auto drop-off for kindergartens
K
K
play yard
bus drop-off

THIS ILLUSTRATES THE IDEAL ARRANGEMENT WHERE THE KINDERGARTEN UNITS ARE IN CLOSE PROXIMITY TO BOTH THE AUTO AND BUS DROP-OFF AREAS.

SIDEWALKS ARE PROVIDED TO LEAD THRU THE PLAY YARD TO THE EXTERIOR DOORS OF THE KINDERGARTENS. INTERIOR CORRIDORS OF SCHOOL WOULD ONLY BE USED IN INCLEMENT WEATHER.

TRAFFIC PATTERNS TO KINDERGARTENS

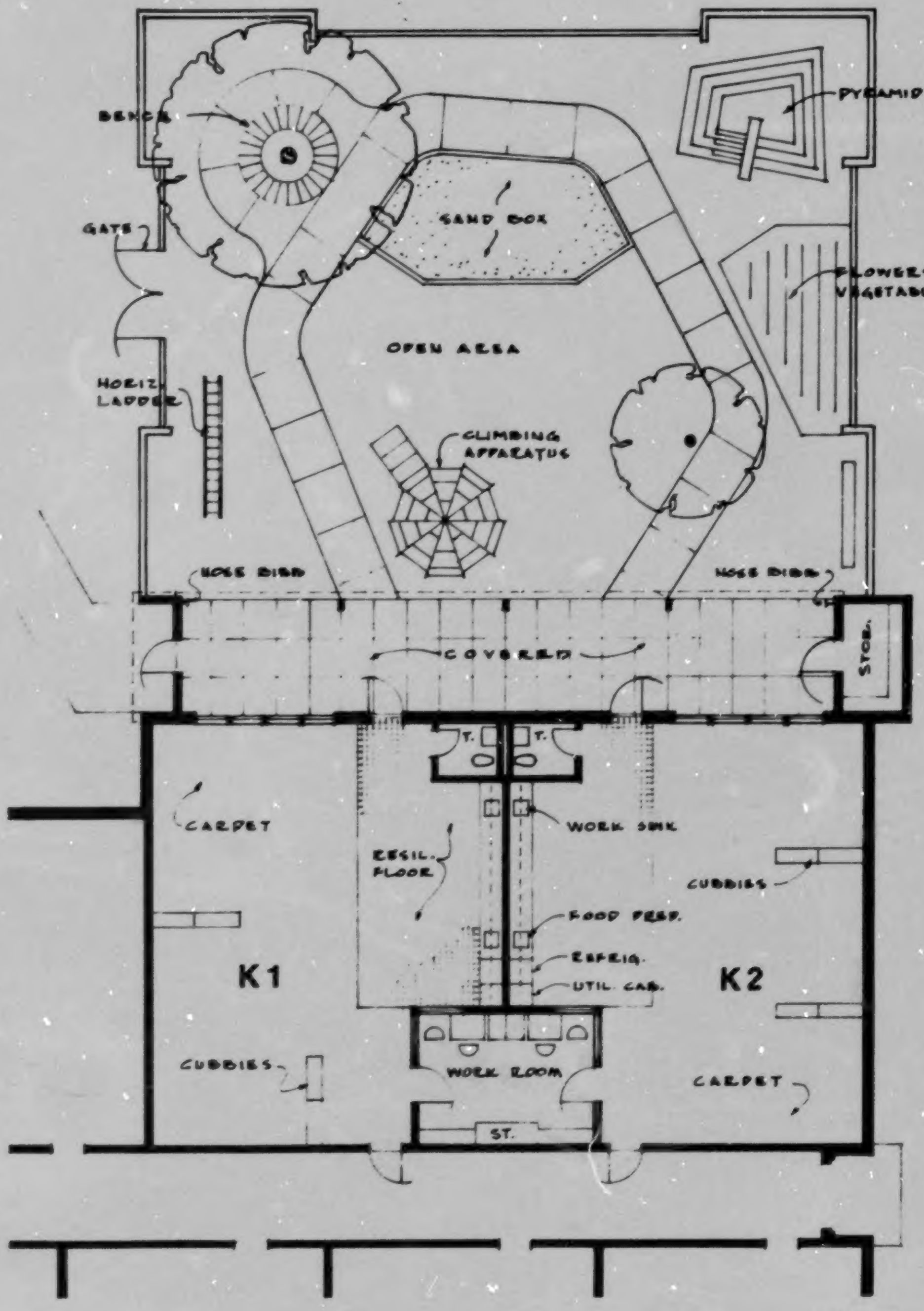
NO SCALE


ARCH
FREE FORM TRIKE PATH
DRIVE
WALL
BRIDGE
SANDBOX
HOSE BIBB
DROP-OFF POINT
OPEN AREA
SIDEWALK
WOOD
PYRAMID
FLOWER/VEGETABLE GARDEN
SLIDE
SEAT
METAL BAR CLIMBING APPARATUS
TIMBER FORMS
OPEN AREA
OPEN AREA
WALL
FREE FORM TRIKE PATH
COVERED
COVERED
HOSE BIBB
STOR.
K 1
K 2

FRED EHNI – ARCHITECT

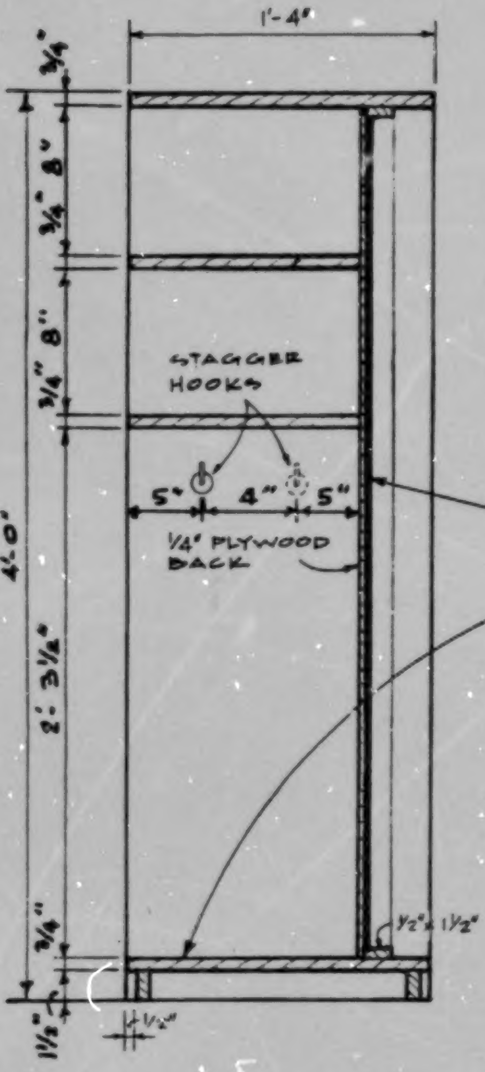
NO SCALE

KINDERGARTEN PLAY YARD

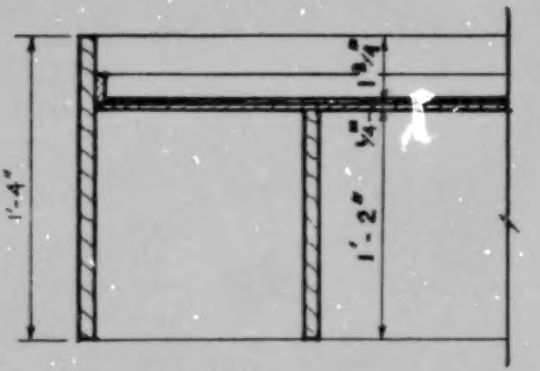

BENCH
PYRAMID
GATE
SAND BOX
FLOWERS & VEGETABLES
OPEN AREA
HORIZ. LADDER
CLIMBING APPARATUS
HOSE BIBB
HOSE BIBB
COVERED
STOR.
T.
T.
CARPET
WORK SINK
RESIL. FLOOR
CUBBIES
FOOD PREP.
REFRIG.
K1
UTIL. CAB.
K2
CUBBIES
WORK ROOM
CARPET
ST.

NO SCALE

TYPICAL DOUBLE KINDERGARTENS & PLAY YARD


1'-4"
3/4"
3/4" 8"
3/4" 8"
3/4"
4'-0"
2' 3 1/2"
3/4"
1 1/2"
1/2"
STAGGER HOOKS
5"
4"
5"
1/4" PLYWOOD BACK
1/2" x 1 1/2"

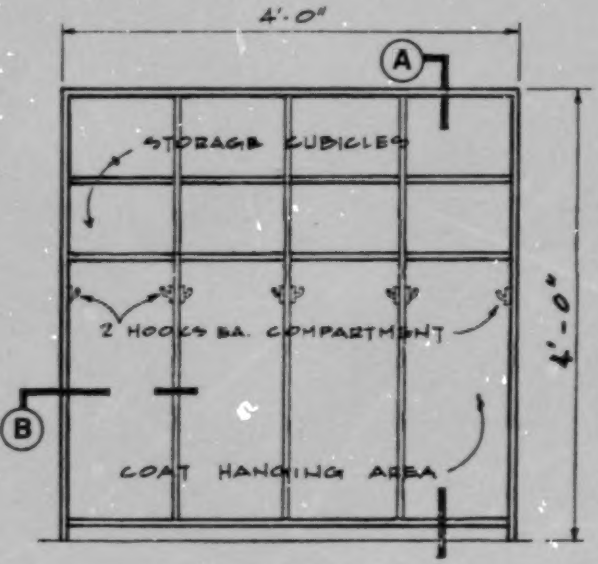
SECT. A



SECT. B

TACKBOARD AND CHALKBOARD APPLIED TO BACKSIDE ON ALTERNATE UNITS. (PEGBOARD MAY BE PREFERRED BY SOME TEACHERS.)

MAIN MEMBERS 3/4" GLUED-UP WOOD, PLYWOOD OR PARTICLE BOARD.


4'-0"
A
STORAGE CUBICLES
2 HOOKS EA. COMPARTMENT
B
COAT HANGING AREA
4'-0"

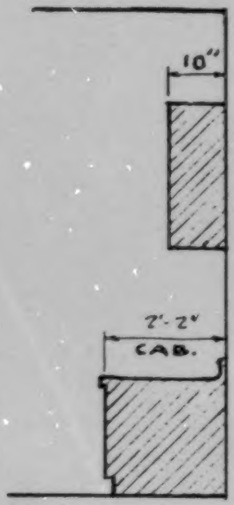
FRONT ELEVATION

THESE UNITS SHOULD BE FABRICATED IN 4'-0" MAX. LENGTH. DO NOT ATTACH TO FLOOR OR WALL AS THEIR PLACEMENT SHOULD REMAIN FLEXIBLE.

KINDERGARTEN CUBBY UNIT

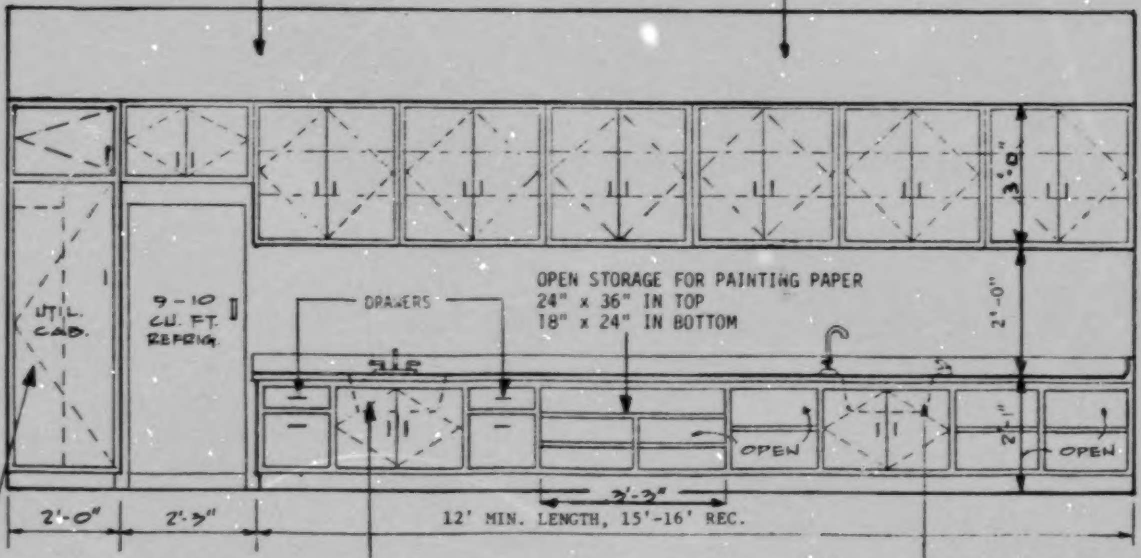
NO SCALE

REVISED



SECTION

UPPER CABINETS ARE RECOMMENDED ONLY. MAY BE PARTIALLY OPEN AND PARTIALLY CLOSED, OR TOTALLY ONE OR THE OTHER.


UTIL. CAB.
9-10 CU. FT. REFRIG.
DRAWERS
OPEN
OPEN
3'-0"
2'-0"
2'-1"
3'-3"
2'-0"
2'-3"
12' MIN. LENGTH, 15'-16' REC.

OPEN STORAGE FOR PAINTING PAPER
24" x 36" IN TOP
18" x 24" IN BOTTOM

MAY BE DIVIDED FOR CLEANING MATERIALS ONE SIDE AND TEACHERS' COAT HANGING OR STORAGE SHELVING ON OTHER SIDE.

SINK FOR FOOD PREPARATION AREA

"CLASSROOM" TYPE SINK FOR GENERAL STUDENT ACTIVITIES AREA

ELEVATION

NOTE: ABOVE DESIGN IS INTENDED AS A GENERAL GUIDE ONLY

WORK COUNTER/FOOD PREPARATION CENTER NO SCALE

REVISED

3.08 GENERAL CLASSROOMS

1. **Basic requirements**: The following **shall** be mandatory and minimum unless otherwise indicated.

Item	Elementary	Middle, Junior High, Senior High
Floor Area	720 sq. ft. minimum (see Item 2)	Same as Elementary
Minimum Width	24 ft. (see Item 3)	Same as Elementary
Individual Toilets	Grades 1-2: Required (see Item 4) Grade 3: Optional Grades 4-6: Not Recommended	Not Required
Sink Cabinet	Grades 1-3: Required (see Item 5) Grades 4-6: Recommended	Not Required
Teacher's Cabinet	Required (see Item 6)	Required (see Item 6)
Teacher's Bookshelving	Recommended (see Item 7)	Recommended (see Item 7)
Coat Storage	Required (see Item 8)	Recommended (see Item 8)
Chalkboard	4' high x 16' long (see Item 9)	Same as Elementary
Tackboard	Grades 1-3: 4' high x 6' long, plus 2 rows tackstrip Grades 4-6: 4' high x 10' long (see Item 9)	4' high x 6' long minimum

2. **Floor Area**: **Shall** be clear, open area exclusive of toilet rooms. However, the area covered with mandated cabinetry and the area used to recess an out-swinging entrance door to a corridor, to the extent of 16 sq. ft. for one door, may be included within the 720 sq. ft. minimum.

3. **Odd-shaped Rooms** (i.e., shapes that usually result from a geometric "pod-type" design): Are permitted.

4. **Individual Classroom Toilets**

   a. Two toilet rooms (one for boys, one for girls) are recommended for each classroom in grades 1 and 2, although one, serving as a unisex arrangement, **shall** be required as a minimum.

   b. Each toilet room **shall** have a 15" water closet and a lavatory, or at district's option, lavatory may be omitted if the counter sink is within close proximity of the door to the toilet area. Recommend cold water only to lavatory. See DIVISION 10—PLUMBING for type of water closet and lavatory mounting height.

   c. Optional arrangements

   - A connecting toilet area serving two classrooms is preferred by some. This normally consists of a connecting hall with a single lavatory, with two toilet rooms opening off the hall, each with a single water closet.

- In a pod-type arrangement of classrooms, small "gang" toilets will be permitted, provided the students do not have to go outside the pod.

d. Individual toilet rooms **shall not** be required to accommodate the physically handicapped, provided a handicapped facility (in either a student gang toilet, or teacher or public toilet) is available to the student and is located within 200' of the classroom door.

e. It is recommended that toilets be large enough for a teacher to be in the compartment to assist a student if necessary. Doors need not be over 2'-4" wide and it is preferred that they swing in.

f. The following accessories are recommended.

- Toilet paper holder, paper towel holder (if lavatory is included), and coat hook on door (at 4'-6" high).
- Mirror 16" x 24"; furnish only if lavatory included with w.c.

5. **Sink Cabinet**

a. Should be a minimum of 8' long, with 10'-12' recommended. Sink **shall** be stainless steel or porcelain enamel single "classroom" type with gooseneck fitting on one side and drinking bubbler on other. Locate sink as close to front of cabinet as possible for convenience of younger children. Recommend cold water only.

b. Recommend partly closed, partly open base cabinet under countertop. Allow for open storage of drawing paper, some 24" x 36" as well as 18" x 24".

c. Upper wall storage cabinets over base cabinet are not mandated, but are highly desirable for additional storage or for books.

d. Install paper towel holder near sink, at appropriate height and location to be convenient to students.

e. Recommended heights of countertops:

Grades 1-3	27"
Grades 4-6	30"

f. Note that sink cabinets are mandated for grades 1-3. They are recommended for grades 4-6, particularly if there is no art room in the school.

g. See page 3-22 for suggested design.

6. **Teacher's Cabinet**

a. Should be a minimum of approximately 2' deep x 7' high x 6' wide for elementary classrooms and 4' wide for secondary classrooms. Provide space approximately 11" wide with rod for coat hanging; remainder of cabinet to be in shelves. Doors should be provided with secure locks.

b. See pages 3-22 and 3-23 for suggested design.

7. **Teacher's Bookshelving**: May be "built-in" item or may be furnished by the district as an item of equipment. Bookshelving is critically needed in elementary classrooms (25-30 lin. ft. is suggested); it is desirable but less critical for secondary classrooms.

8. **Coat Storage**

a. Elementary: Recommend open hooks approximately 6" o.c. at 3'-3" high for grades 1-3, and 3'-8" high for grades 4-6. Individual cubicles for each student, approximately

12" wide x 9" high, are recommended to be provided above coat-hanging area for hats, books, etc.

- Coat hangers on rods should not be used although sliding hooks on rods would be satisfactory. Avoid use of coat cabinets with doors.

b. Secondary: It is assumed that individual lockers are to be provided out of the classrooms, or otherwise coat hooks should be installed in classrooms. See Section 3.24 for locker recommendations.

9. **Chalkboard, Tackboard**

a. Consult the district for desired grouping and placement. The district may wish to consider an adjustable type which allows height adjustment, as well as changing of unit locations.

b. All units should have factory-assembled extruded aluminum frames. All chalkboards should have chalktrays and map rails with cork inserts. 24 ga. porcelain steel faces are recommended with manufacturer's standard 50-year guarantee.

c. If an overhead projector screen is to be mounted on the same wall as the chalkboard, consider splitting chalkboard to either side of screen.

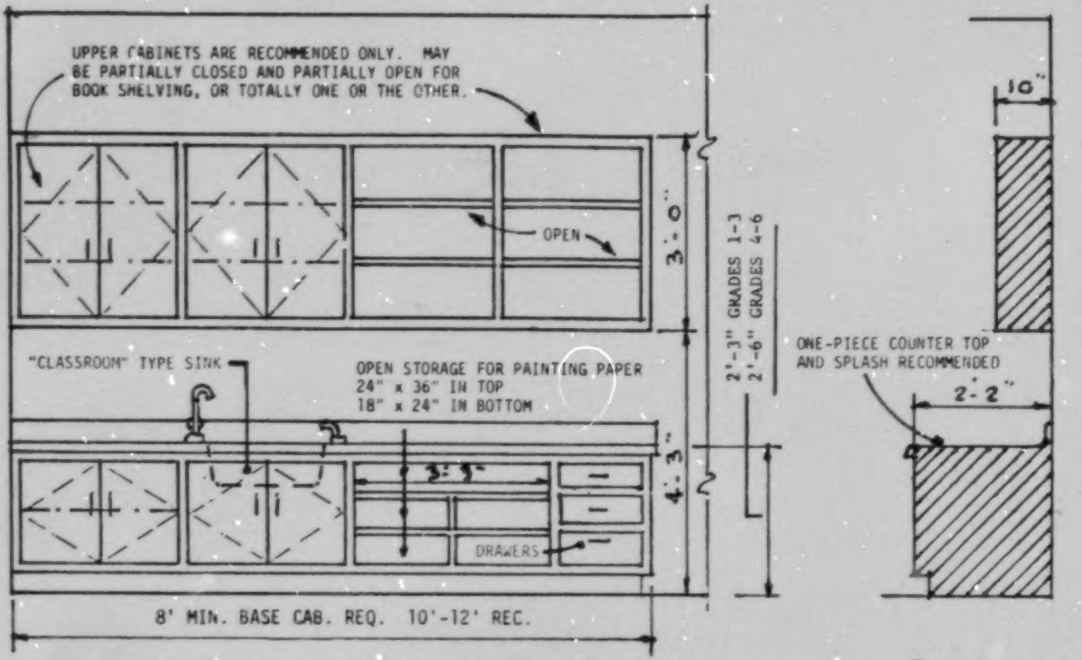
d. Recommended heights to bottoms of chalkboard and tackboard:

Grades 1-3	26"	Grades 7-8	32"
Grades 4-6	29"	Grades 9-12	35"

e. In grades 1-3, mount two rows of cork-insert tackstrip on as much wall space as possible (preferably 20 lin. ft. each strip) for display of student work. Bottom row at 2'-10", top row at 4'-10".

10. First-grade classrooms **shall** always be located on the ground-floor level, and second-grade classrooms **shall** be no higher than the second floor.

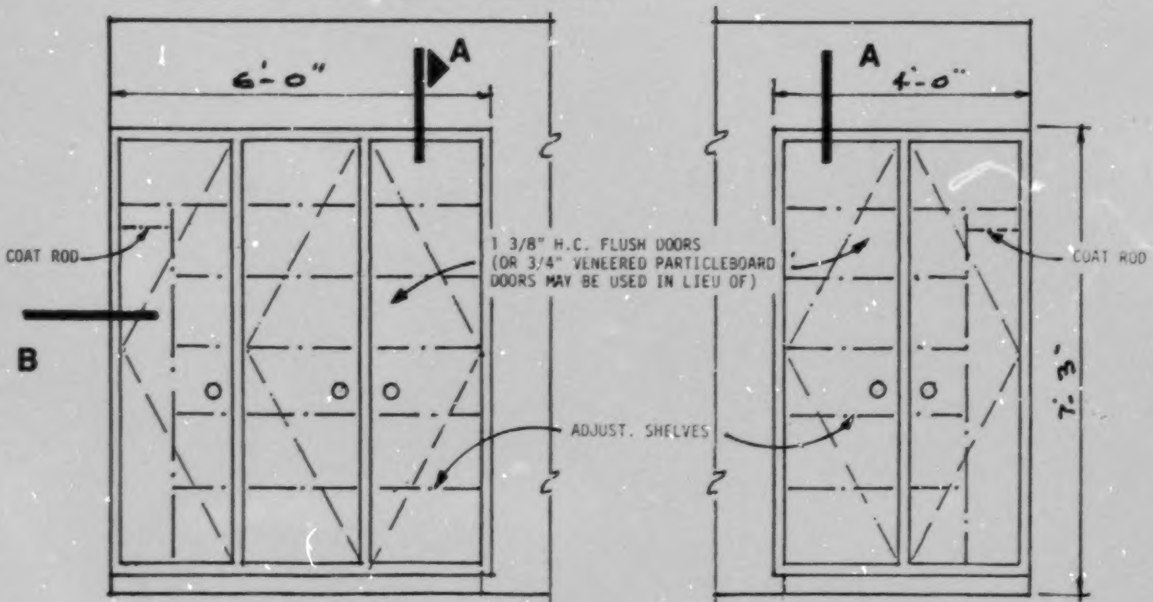
11. See DIVISION 10—PLUMBING for other heights of fixtures and equipment.


UPPER CABINETS ARE RECOMMENDED ONLY. MAY BE PARTIALLY CLOSED AND PARTIALLY OPEN FOR BOOK SHELVING, OR TOTALLY ONE OR THE OTHER.
OPEN
3'-0"
2'-3" GRADES 1-3
2'-6" GRADES 4-6
"CLASSROOM" TYPE SINK
OPEN STORAGE FOR PAINTING PAPER
24" x 36" IN TOP
18" x 24" IN BOTTOM
3'-5"
4'-3"
DRAWERS
8' MIN. BASE CAB. REQ. 10'-12' REC.
10"
ONE-PIECE COUNTER TOP AND SPLASH RECOMMENDED
2'-2"

CLASSROOM · · SINK CABINET

SECTION

NOTE: ABOVE DESIGN IS INTENDED AS A GENERAL GUIDE ONLY

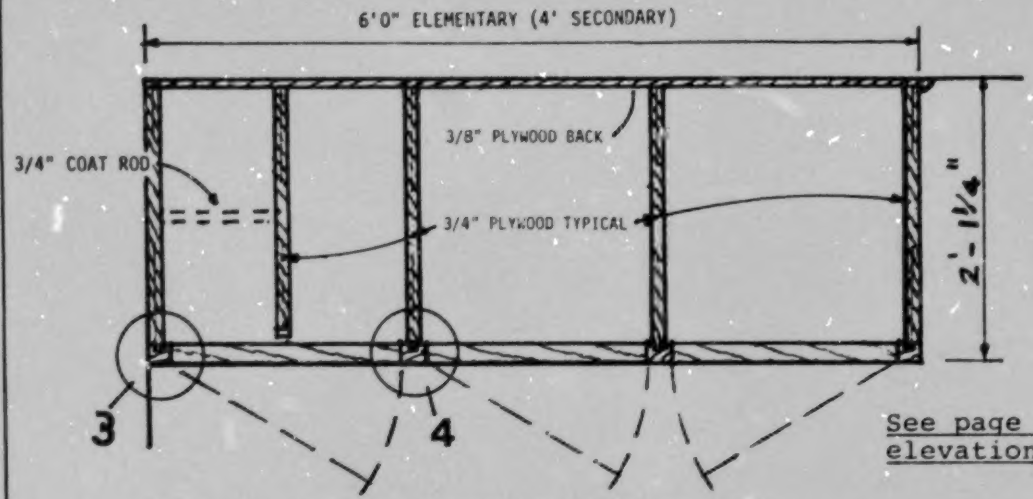

A
6'-0"
A
4'-0"
COAT ROD
B
1 3/8" H.C. FLUSH DOORS
(OR 3/4" VENEERED PARTICLEBOARD DOORS MAY BE USED IN LIEU OF)
COAT ROD
7'-3"
ADJUST. SHELVES

ELEV - ELEMENTARY **ELEV - SECONDARY**

NOTE: ABOVE DESIGN IS INTENDED AS A GENERAL GUIDE ONLY

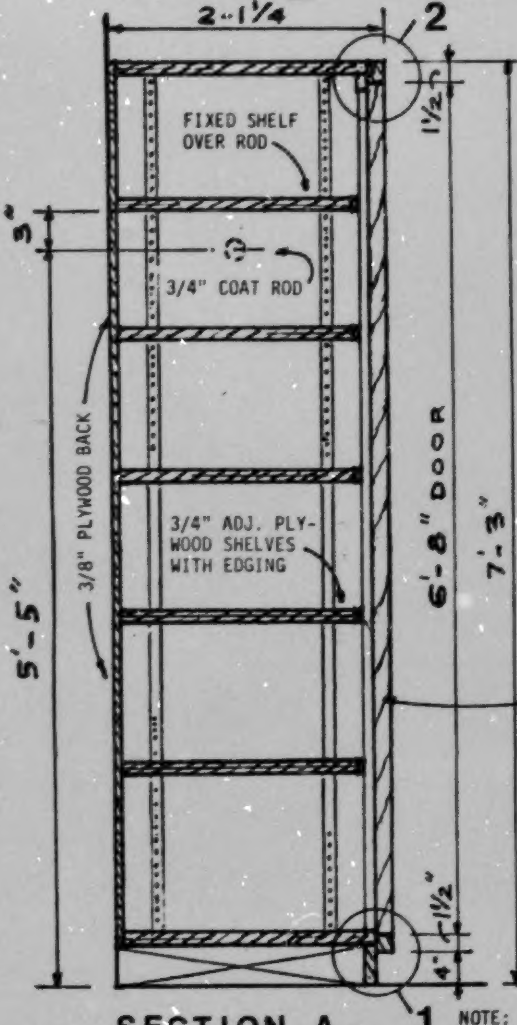
See page 3-23 for suggested fabrication details

CLASSROOM · · TEACHERS' CABINET NO SCALE

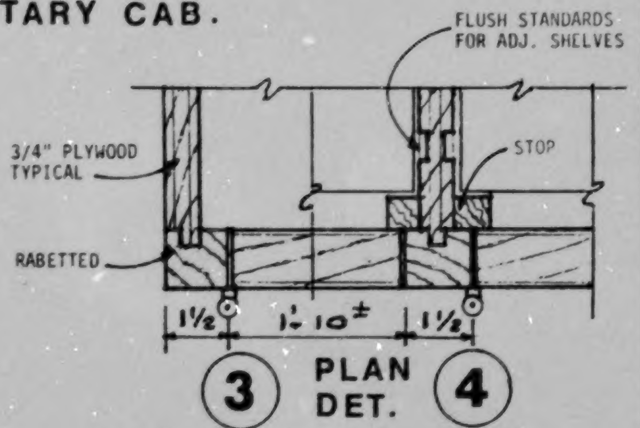

6'0" ELEMENTARY (4' SECONDARY)
3/8" PLYWOOD BACK
3/4" COAT ROD
3/4" PLYWOOD TYPICAL
2'-1¼"
3
4

See page 3-22 for elevation drawings

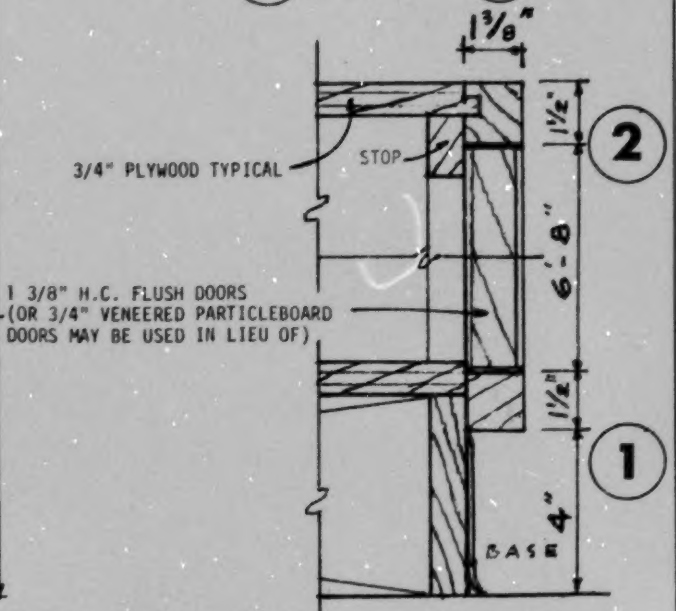
PLAN AT B - ELEMENTARY CAB.


2-1/4
2
FIXED SHELF OVER ROD
3"
3/4" COAT ROD
3/8" PLYWOOD BACK
3/4" ADJ. PLYWOOD SHELVES WITH EDGING
5'-5"
1½"
6'-8" DOOR
7'-3"
1½"
4"
1

SECTION A


FLUSH STANDARDS FOR ADJ. SHELVES
3/4" PLYWOOD TYPICAL
STOP
RABETTED
1½
1'-10±
1½
3
4

PLAN DET.


1⅜"
3/4" PLYWOOD TYPICAL
STOP
1½"
2
6'-8"
1 3/8" H.C. FLUSH DOORS (OR 3/4" VENEERED PARTICLEBOARD DOORS MAY BE USED IN LIEU OF)
1½"
1
4"
BASE

NOTE: ABOVE DETAILING IS INTENDED AS A GENERAL GUIDE ONLY

SECT. DET.

TEACHERS' CABINET DETAILS

NO SCALE

REVISED

3.09 SPECIAL EDUCATION

1. General

a. Special education students in South Carolina public schools are generally classified under one or more of the following categories.

Educable Mentally Handicapped	(EMH)
Trainable Mentally Handicapped	(TMH)
Speech and Language Handicapped	(SH)
Hearing Handicapped	(HH)
Orthopedically Handicapped	(OH)
Visually Handicapped	(VH)
Learning Disabilities	(LD)
Emotionally Handicapped	(EH)
Profoundly Mentally Handicapped	(PMH)

b. Enrollment may vary somewhat in the various handicapped programs from year to year, and facilities should be designed large enough to allow for reasonable flexibility in this regard.

c. The types of classrooms to serve handicapped students fall under three broad categories.

Self-Contained Classrooms
Resource Rooms
Itinerant Facilities

d. The following describes the facilities that will accommodate most programs. However, certain programs, such as for the severely emotionally handicapped, the severely mentally handicapped, and the severely physically, visually, or hearing impaired, will require special considerations that will not be dealt with here. Further information and guidance can be obtained from the consultants in the Office of Programs for the Handicapped.

2. Self-Contained Classrooms

a. General: Handicapped pupils who need a self-contained program placement are those whose handicapping condition and concomitant problems are of the severity to require the pupil to remain basically with one teacher during the school day. The ages of students in this type of program will vary, usually spanning more than one grade level.

b. Enrollment: Will be smaller than the number enrolled in normal elementary or secondary classrooms. The maximum enrollments permitted by DMP requirements are as follows.

Elementary: 10 to 15 students depending on the category of disability.
Secondary: 12 to 18 students depending on the category of disability.

c. Classroom Size: A minimum sized classroom of 720 sq. ft. should be provided in all cases where the anticipated enrollment will approach the 15 (elementary) or 18 (secondary) maximums indicated under Paragraph b above.

- If the district is positive that substantially less enrollments are to be expected with no marked increase ever anticipated, the area of the room may be scaled down somewhat proportionately. Consult with OSP&B.

d. Plumbing Requirements

- Unless otherwise waived by OSP&B, individual toilet rooms **shall** be provided in all elementary self-contained classrooms and **shall** contain a water closet and lavatory and **shall** be designed for wheelchair use.

- It is recommended that individual toilet rooms be provided for secondary self-contained classrooms, especially TMH, OH, VH, EH, and PMH, but this is not mandated.

- Sink cabinets **shall** be included in all elementary self-contained classrooms of the same design as for classrooms for normal students; counter height should be determined by the age level expected to occupy the room. Sink cabinets shall be optional in secondary facilities.

e. Other Requirements: Classroom shall be equipped as those for normal students in a school of comparable classification (i.e., elementary or secondary) regarding teacher's cabinet, coat facilities, chalk- and tackboards, and other cabinetry. A minimum of six electrical receptacles should be provided for equipment requirements.

f. Location: Should be easily accessible to cafeteria, library, and other centered activities. Avoid remote locations that would tend to give psychological feelings of isolation or uniqueness. All self-contained classrooms, elementary and secondary, **shall** be located on an exterior wall with minimum of one window, unless waived by OSP&B.

3. **Resource Rooms**

a. General: Students with mildly handicapping conditions frequently are assigned to a resource special education class for one to three hours daily. Primarily, the handicapping condition of these pupils is the result of educational or intellectual impairment, but it can be expected that they will exhibit the same physical and social characteristics as nonhandicapped pupils of the same age. Educationally, these pupils require small group and individualized instruction. The ages of students in this type of room will vary, usually spanning more than one grade level.

b. Enrollment: Six to eight students generally.

c. Room Size: 360 sq. ft. (half the size of a regular-sized classroom) should accommodate most expected enrollments.

d. Plumbing Requirements: Ordinarily none, although some programs may benefit by having a sink counter. Consult district.

e. Other Requirements: Chalk-and tackboards as directed by the district. Teacher's cabinet shall be furnished same as for all regular classrooms. No student coat storage facilities normally required. Number of electrical receptacles should be increased over the norm because of equipment requirements.

f. Location: As central as feasible to the classrooms that the resource room will serve.

4. **Itinerant Facilities**

a. General: At least one room in any elementary or secondary school **shall** be provided for itinerant services; in many cases more than one may be needed depending on the size of the school. Since needs may fluctuate, other areas of a school may be used on a partial basis for this purpose, such as library conference rooms.

b. Enrollment: One to five students generally.

c. Room Size: Base upon maximum number of students to be served at one time @ 35 sq. ft. each, except that minimum size should not be less than 135 sq. ft.

d. Plumbing: Not normally needed.

e. Other Requirements: Small chalkboard and tackboard may be needed as well as storage facility (mainly for speech therapy). Consult the district. Each wall should have an electrical receptacle for equipment requirements.

f. Location: Not critical, although preferred near the general administration and public entrance area of the building.

5. **Office of Programs for the Handicapped, South Carolina Department of Education**

Call consultants in this office if further information is needed.

3.10 MEDIA CENTERS

1. **Location**

a. Should be centrally located with regard to classrooms and should be in the main academic building. Location on first floor preferred so that facility can be readily accessible for after-hours or summer programs, in which case consider isolating media center and administration area by locked corridor doors or other arrangement to make remainder of building inaccessible.

b. Should not be located near potentially noisy areas such as band or choral rooms, gymnasiums, or playgrounds.

c. Consider in the initial design stage expansion possibilities in case of future enrollment growth, particularly if reading room does not border on an exterior wall. Adjoining classrooms are usually the most feasible expansion possibility; avoid being "boxed in" by stairs, mechanical rooms, science labs, and the like.

2. **Reading Rooms**

a. The minimum size of the reading room for each media center **shall** be determined as follows.

- Elementary: For schools having an enrollment of up to one thousand (1,000) students, 10 percent of the enrollment multiplied by 30 sq. ft., with a minimum size being 1200 sq. ft.
- Secondary: For schools having an enrollment of up to two thousand (2,000) students, 15 percent of the first 400 students plus 10 percent of the remainder, the total to be multiplied by 30 sq. ft.
- For schools having enrollments in excess of the above, the additional area required should be determined by the district, based on the students to be seated at any one time, volumes to be accommodated, and type of programs expected to be utilized.

b. The amount of student seating to be provided in the reading room should be determined by the district, based on anticipated needs.

- A maximum of 30 percent of the reading room seating should be at carrels. In primary schools, 48"-round wired tables may be used also in addition to carrels.
- Tables should seat a maximum of four students and lounge furniture or casual chairs should be provided for a small percentage of those to be seated in the reading room (in primary schools, as many as 20 students may be seated on floor for storytelling activities).
- Each conference room should seat a minimum of six students.

c. Avoid odd-shaped reading room. Librarian should have visual control of entire facility.

d. Avoid use of storytelling "pits" or stages unless space is generous; they tend to make floor space less flexible.

e. General: Floor should be carpeted. Provide display case, and tackboards as directed by district; consider mounted screen in storytelling area of elementary schools. Provide adequate electrical floor and wall outlets; ceiling lighting should be on more than one switch for intensity control.

3. **Office/Workroom**

a. These areas **shall** be required in all media centers and are most often combined, although in larger secondary schools a separate office may be desired. Recommend an area a minimum of 180 sq. ft. in smaller schools and up to 250 sq. ft. in larger schools. Should be 11'-12' minimum width.

b. Should have 36" high work counter on one wall with stainless steel double sink and swing faucet with hot and cold water, and with storage cabinets below and upper wall storage cabinets. Coat-hanging storage for librarian desirable. Provide as much bookshelf space as possible. Need space for typing desk and minimum of one chair.

c. Generous glass area should be provided for overview of reading room. If conference room should adjoin office/workroom, provide glass viewing panel between the two.

4. **Conference Room(s)**

a. A minimum of one **shall** be required in all media centers, with two recommended in larger elementary schools and two or more in larger secondary schools. Recommend 120 sq. ft. with 10' width.

b. Install wall bookshelves where possible. Provide glass viewing panel to reading room for supervision purposes.

c. Where two conference rooms occur, recommend a folding door between them to provide size flexibility.

5. **Audio-visual Storage Room**

a. One **shall** be required in all media centers. Should be very secure with no windows or viewing glass permitted. Size should be determined by amount of hardware to be housed plus consideration for video tape recording center if placed here. Usually 165-225 sq. ft. is needed with 11'-12' minimum width.

b. Door to AV storage should open into reading room and should be in close proximity to main corridor entrance to media center if possible; otherwise a second non-access door from AV storage directly to corridor may be considered. Type and amount of shelving to be determined by district's requirements.

6. **Periodical Storage**: In elementary schools, a conference room may be used to house periodical collection. In secondary schools, a separate room of 150 sq. ft. minimum is recommended.

7. **Additional Spaces**: TV studio, professional library, darkroom, etc. as per district's program.

8. **ETV/VTR**

a. TV outlet should be provided in reading room, elsewhere at district's direction.

b. Use of video tape recording equipment (VTR) is increasing rapidly and all new facilities should at least be provided with conduit provisions for this. This equipment is most often located in the AV storage room, but may also be in the office/workroom.

c. For suggested VTR console designs, see Television Building Distribution Specifications in DIVISION 15—REFERENCE MATERIALS.

9. **Wired Carrels**: Recommend locating these in reading room in general area near AV storage. May be in ranges or complexes. Wireless headsets may also be used.

10. **Bookshelving**

  a. State standards require the following minimum number of books to be housed in a media center.

Grades K-6	10 volumes per student enrolled
Grades 7-8	8 volumes per student enrolled
Grades 9-12	6 volumes per student enrolled

  However, a minimum of 10 books per student is recommended for **all** schools, and the district should be consulted as to the number to be actually allowed for (most districts wish to meet other accreditation standards also, such as those of the Southern Association of Colleges and Schools).

  b. Allow eight books per lin. ft. of shelf space; count shelving in office/workroom, conference room, periodical room, and reading room in computing total.

  c. Locate shelving on all possible walls and under glass view windows. Install free-standing shelving only if necessary amount cannot be obtained by wall shelves. Wood shelving preferred for quietness; individual shelves should be adjustable.

  d. Free-standing counter-type shelving, exclusive of stacks, should not be higher than 42" because of problems of supervision.

  e. Widths: Approximately 10" and 12" (depending on manufacturer's standards). Consult with district as to the different widths desired.

  f. Lengths: 3' sections, with ranges of free-standing counter shelving broken at 6' maximum intervals for aisle.

  g. Maximum Heights:

Wall shelving — Elementary	72" maximum
Wall shelving — Secondary	84" maximum
Counter shelving — all schools	42" maximum
Storage shelving — all schools	84" or to ceiling

  h. Picture book shelving (with dividers) should be used for primary books and should be housed in 42" counter shelving or on lower three shelves of standard wall shelving.

  i. Special shelving for periodicals and newspapers is optional.

11. **Tables**

  a. Sizes: 42" square, 42" round, or 3' x 5' oblong; tables larger than these should not be used except that one or two 48"-round (wired) tables should be included for primary grades. Allow four students at each table for seating calculations.

  b. Heights: 26" primary; 28" elementary; 30" secondary.

  c. Chair heights: 15" primary; 17" elementary and secondary.

12. **Other Furnishings**

  a. Lounge furniture and occasional chairs recommended.

  b. Circulation Desk: 29" high elementary; 39" secondary.

c. Card Catalog and Stand (lower leg base is needed for elementary schools).

To determine the number of catalog drawers needed:

$$\frac{\text{Multiply number of volumes} \times 5}{1{,}000} = \text{number of drawers needed}$$

d. Vertical File: One or more legal-sized four-drawer type.

e. Newspaper Racks: Not recommended for elementary; optional for secondary.

f. Atlas Stands: Atlases may be housed on regular shelving in elementary or small secondary schools.

g. Dictionary Stands: Revolving tabletop stands are recommended.

h. Book Truck: One or more needed.

13. **Security System**

Architect should consult district about desirability of including security system at exits from library reading room.

14. **School Services Unit, Office of General Education, South Carolina Department of Education**

Call library consultants in this office if further information is needed.

3.11 TEACHERS' LOUNGES

1. **Traditional Concept**: One central lounge for all teachers with teacher toilets in the same general area. In multistory buildings, a lounge should be considered for each floor.

a. Size: To depend on number of teachers to be served. The average size ranges from 200-275 sq. ft.

b. Equipment

- Recommend a base cabinet and 36" countertop approximately 6' to 8' long with sink and swing-faucet fitting with hot and cold water.
- Range top and built-in oven may be included, or portable countertop oven and hot plate may be used instead.
- It is desirable to have upper wall cabinets over the base cabinet for general storage.
- Provide space in the room for one or two drink-dispensing machines.

c. Recommend teachers' toilets to be near lounge, but toilets should **not** open directly off the lounge itself. Make access to toilets off sub-corridor or corridor alcove, preferably.

d. Consult the district as to advisability of installing a telephone in the lounge.

2. **Another Concept**

a. Teachers' lounges may be combined with teacher offices/workrooms where the latter are provided for all teachers in a certain curriculum (science, math, etc.) or for all teachers in certain elementary grade levels, for examples. A sink with a generous work counter and refrigerator space should be allowed for, in addition to an individual desk, chair, and file cabinet for each teacher. Usually 60-70 sq. ft. per teacher is required for this combination arrangement.

b. Even if the lounge/office/workroom concept is utilized, a small central lounge may still be needed for administrative personnel and possibly some teachers not a part of the office/workroom concept.

3.12 BOOKROOMS

1. **General**

   a. The most common arrangement for storage of textbooks is for one central bookroom where all books are kept in summer storage. (Some districts, however, may prefer two or even three smaller rooms, depending on the layout and size of the school.) Also consult the district as to whether the area is to be devoted entirely to books or whether some general storage should also be allowed for.

   b. Either mechanical or natural ventilation should be provided, especially for summer storage. Provide closure to reduce ventilation when not needed.

   c. Area should be securely locked and should have **no** windows.

   d. Consult the district about type of door desired (one single door or "dutch"-type door).

2. **Aisles**: 2'-10" minimum, 3'-0" recommended, between rows of bookshelves.

3. **Shelving**

   a. Allow .85 lin. ft. of shelving per student (or 85 lin. ft. per 100 students) for all grade levels.

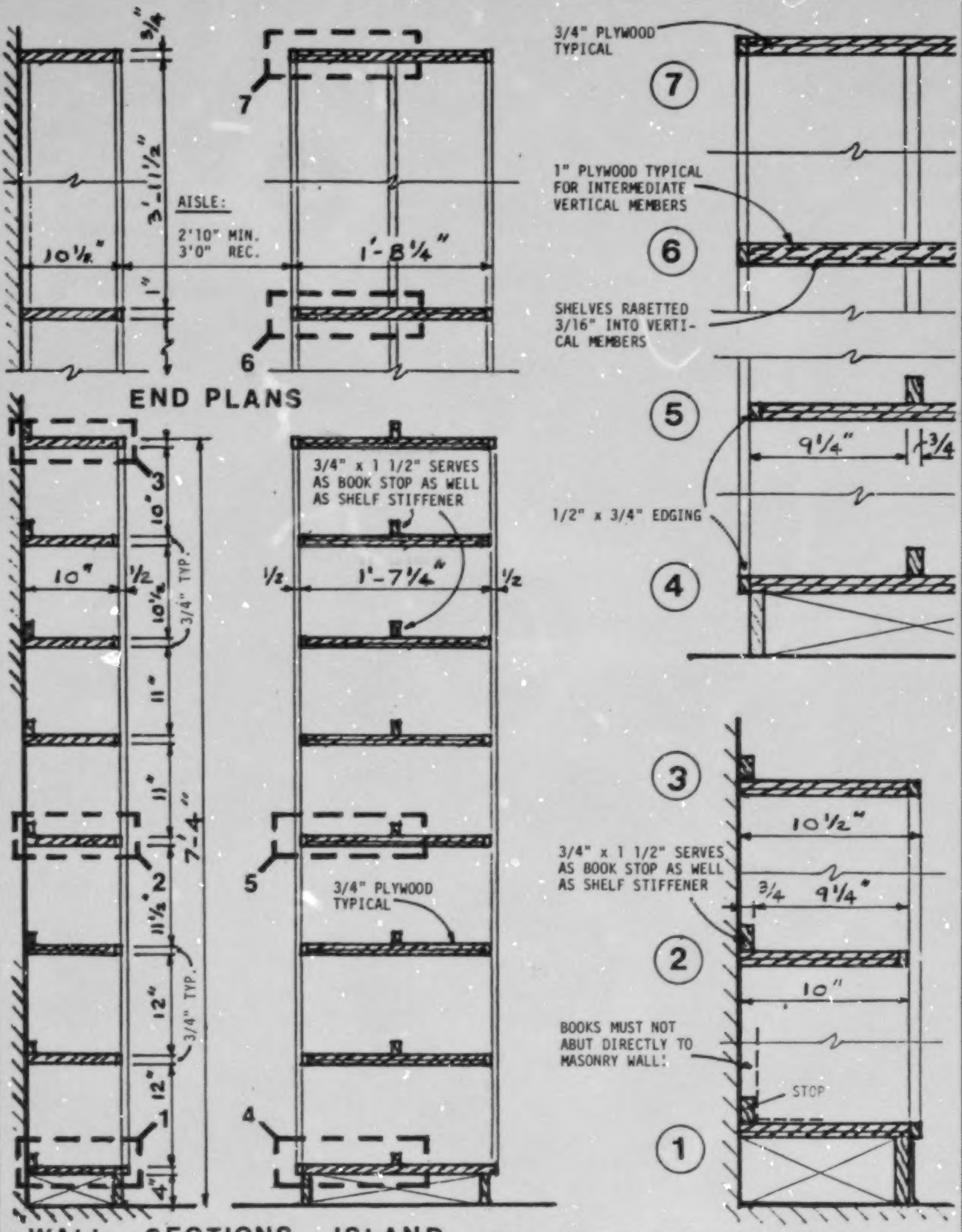
   b. In calculating the number of students to be served, it is recommended that 15 percent be added to cover a possible growth in enrollment.

   c. Recommend seven shelves high.

   d. Shelving may be "mill-made," or may be metal or wood manufactured library-type shelving.

   e. Books should **not** directly abut masonry walls. Allow ventilation space.

   f. See suggested details for "mill-made" shelving on following sheet. Fixed shelving is indicated, but the architect may wish to modify for adjustable shelving.


3/4"
3'-11 1/2"
1"
10 1/2"
AISLE:
2'10" MIN.
3'0" REC.
1'-8 1/4"
7
6
3/4" x 1 1/2" SERVES AS BOOK STOP AS WELL AS SHELF STIFFENER
10"
1/2
10"
10 1/2"
3/4" TYP.
11"
11"
7'-4"
11 1/2"
12"
3/4" TYP.
12"
4"
3
2
1
1/2
1'-7 1/4"
1/2
5
3/4" PLYWOOD TYPICAL
4
3/4" PLYWOOD TYPICAL
⑦
1" PLYWOOD TYPICAL FOR INTERMEDIATE VERTICAL MEMBERS
⑥
SHELVES RABETTED 3/16" INTO VERTICAL MEMBERS
⑤
9 1/4"
3/4
1/2" x 3/4" EDGING
④
③
10 1/2"
3/4" x 1 1/2" SERVES AS BOOK STOP AS WELL AS SHELF STIFFENER
3/4
9 1/4"
②
10"
BOOKS MUST NOT ABUT DIRECTLY TO MASONRY WALL!
STOP
①

END PLANS

WALL — SECTIONS — ISLAND

NOTE: ABOVE DETAILING IS INTENDED AS A GENERAL GUIDE ONLY

BOOKROOM SHELVING

NO SCALE

3.13 TOILET FACILITIES

1. **Required Toilet Facilities**

   a. Every individual building **shall** be provided with toilet facilities as hereafter stipulated in this section, unless otherwise waived by the OSP&B and/or DHEC.

   b. In cases where the toilet facilities in an existing building do not meet the requirements of this guide and an addition is proposed to be added to the building or a major renovation undertaken, then sufficient new facilities **shall** be added to bring the overall fixture count up to the requirements herein.

2. **General Student Toilet Rooms** ("gang" type)

   a. Location

   - Locate with respect to normal flow of student traffic; when remote, toilet rooms will be little used. Locate to conveniently serve specialized areas such as music, vocational, or the cafeteria, in addition to classroom wings. Locate to be accessible for after-school activities when portions of the building may be locked off (for PTA meetings or for school band after a football game trip, for example).

   - Avoid overly large toilet rooms that present additional problems of supervision. Recommend toilets to serve not over ten to twelve teaching stations.

   - In multistory buildings, toilet rooms **shall** be located on each floor and sized to serve the number of students located on that floor.

   b. The design load for the number of students to be served, both elementary and secondary, **shall** be calculated as follows.

   - Per instructional classroom or area used as a "homeroom": 30 each, except exclude students in classrooms with individual toilets.

   - Per T & I vocational shop: 25 each

   - Consider allowance for future expansion or for possibility of addition of "relocatable" classrooms. Consult district.

   - Divide design load by one-half to ascertain boy/girl ratio, except in the case of vocational facilities, base on district's estimate of sex ratio (auto mechanics, masonry, carpentry, and such would be largely boys while typing, home economics, and the like would be mostly girls).

   c. Fixture count **shall** be calculated as follows.

   - Do **not** include fixtures in individual toilet rooms or in gymnasium dressing room areas.

   - It may include fixtures in toilet rooms designed mainly for the public (auditoriums, gymnasiums), but only if they are close to the mainstream of student traffic.

   - Fractions: In calculating fixture counts, go to the next higher number if the fraction of a fixture is .3 or larger.

   - In the following fixture ratio table, the combined number of water closets and urinals for boys will approximately equal the number of water closets for girls, thus facilitating a back-to-back layout.

- MANDATED FIXTURE RATIOS—STUDENT TOILET ROOMS (**all grades**)

	Water Closets	Lavatories	Urinals*
Boys	1:90	1:60	1:45
Girls	1:30	1:60	--

* TROUGH URINALS **SHALL NOT** BE PERMITTED.

3. **Public Toilet Rooms** ("gang" type for large gatherings)

a. Location

- Locate where convenient to the building areas that serve large numbers of the public, such as auditoriums and gymnasiums.
- While it is permissible for the public to use student toilets after hours, the architect should remember that it is usually desirable to block off entry by the public into other areas of a building other than the portion in immediate use.

b. The design load for the number of persons to be served **shall** be calculated as follows.

- Auditoriums: Number of seats.
- Gymnasiums: Number of spectator seats (not necessary to include possible chair seating on gym floor).
- Divide design load by one-half to ascertain male/female ratio.

c. Fixture count **shall** be calculated as follows.

- It may include student toilet fixtures if in a readily accessible and convenient location to area being served.
- Fractions: In calculating fixture counts, go to the next higher number if the fraction of a fixture is .3 or larger.
- In the following fixture ratio table, the combined number of water closets and urinals for males will approximately equal the number of water closets for females, thus facilitating a back-to-back layout.
- MANDATED FIXTURE RATIOS—PUBLIC TOILET ROOMS

	Water Closets	Lavatories	Urinals*
Male	1:360	1:240	1:180
Female	1:120	1:240	--

* TROUGH URINALS **SHALL NOT** BE PERMITTED.

4. **Gymnasium Dressing Room Toilets and Showers** (secondary schools)

a. Location: Each boys' and girls' PE and varsity athletic dressing room may have its own self-contained facilities, or in some cases a combined-use layout may be designed by means of doors (for security) that permit the combined facilities to be available to either the PE in the morning or to varsity athletics in the afternoon or evening. This should reduce the number of fixtures required and probably the square foot area to some degree. If a combined-use facility is designed, base on largest number anticipated at any one time.

b. The design load for the number of students to be served **shall** be calculated as follows.

- PE: Maximum number enrolled at any one period (each class may run as high as 40). Divide by one-half to ascertain boy/girl ratio.

- Varsity Athletics: Maximum number expected to be served at any one time. Take into consideration any "overlapping" sports such as football and basketball. Determine boy/girl ratio by expected squad sizes.

c. Fixture count **shall** be calculated as follows.

- Fractions: In calculating fixture count, go to the next higher number if the fraction of a fixture is .3 or larger.

- Pedestal-type shower installations are generally recommended rather than wall heads. It is acceptable to include as many as six heads on each boys' pedestal and five heads on each girls' pedestal. Individual enclosures with curtains **shall** be required for girls; they may be "pie-shaped" stalls without dressing cubicles, around a pedestal, or rectangular combination shower/dressing compartments either around a pedestal (four compartments per pedestal) or on separate wall heads.

- MANDATED FIXTURE RATIOS—PE/ATHLETICS TOILETS/SHOWERS

	Water Closets	Lavatories	Urinals*	Shower Heads	
				P.E.	Athletics
Boys	1:60	1:40	1:30	1:4	1:4
Girls	1:20	1:40	--	1:4	1:4

*TROUGH URINALS **SHALL NOT** BE PERMITTED

5. **Football Stadium Toilet Rooms**

a. The fixture ratio count following is recommended for football stadium toilet rooms but is not mandatory. The district may wish to modify, based on local anticipated needs and past experience.

b. It is recommended that the design load be divided by one-half to ascertain male/female ratio.

	Water Closets	Lavatories	Urinals*
Males	1:900	1:600	1:450
Females	1:300	1:600	--

* TROUGH URINALS **ARE** PERMITTED AND SHOULD BE EQUIPPED TO HAVE CONSTANT WATER FLOW WHEN IN USE

6. **Toilet Room Doors**

a. Doors may be omitted from student "gang" toilets (not public) upon the following conditions.

- Electric hand driers should be used in lieu of paper towels.

- Attention is given to acoustic control (flush valve noise, etc.), although lay-in acoustic ceilings are not recommended for toilet areas.

7. **Sightlines**

   a. In "gang" toilets, a fixture or portion of a person using a fixture (except for lavatories), **shall not** be visible through door openings or through cracks at hinged side of doors when doors are in open position.

   b. Use of two doors in tandem with alcove between should not be used as a sight-block because of attendant problems related to discipline and supervision due to the area becoming more remote.

8. **Toilet Partitions**

   a. Metal partitions or metal doors should not be used due to deleterious effects of urine and moisture.

   b. Recommend solid plastic or plastic-covered partitions, or masonry or concrete partitions (properly braced and/or reinforced for safety).

      Masonry or concrete should be used for all partitions in gymnasium dressing areas and for football stadium toilet rooms, or any other such high-abuse areas.

   c. Partition doors: At district's option, these may be omitted in all boys' toilet rooms except a door **shall** be required on at least one stall and this should be the stall to serve wheelchairs if such is included; where doors are omitted, install coat hook on partition panel. Door **shall** be required on all compartments for girls and for all compartments in public toilets.

   d. Recommend 2'8" x 5'0" toilet stalls except for wheelchair use (see Item 9). Doors should swing in.

   e. Recommend masonry screen wall between lavatories and urinals if the two are in close proximity (do not use wall-mounted manufactured screens due to vandalism problem).

9. **Barrier-Free Design**

   a. Also see DIVISION 4—BARRIER-FREE DESIGN.

   b. It is recommended that all toilet compartments for the physically handicapped be 5' x 5' in size, with the water closet located in one corner with the centerline at 1'6" from the side of the compartment (this size and layout gives superior maneuverability along with a turning capability within the compartment and is the most convenient to a person in a wheelchair).

      If the above compartment design is not utilized, then a 3'0" x 5'6" (for wall-mounted w.c.) or a 3'0" x 5'9" (for floor-mounted w.c.) compartment **shall** be used, minimum size.

   c. While regulations require only one handicapped facility for each sex on each floor of a building, it is recommended that all general (gang) toilets for both students and the public be made accessible to the handicapped, particularly since portions of a building may be closed off when after-hours events occur. It is also desirable for teachers' toilet areas to be made accessible to the handicapped.

   d. Toilet/shower facilities in PE dressing room areas **shall** be equipped to serve the physically handicapped. This is not required in the varsity athletic facilities.

10. **Bookshelf**: Each general student toilet area in secondary schools **shall** have a bookshelf not less than 4' long and 8" wide; **shall** be of cast or precast concrete, masonry, or structural steel securely anchored. Lightweight manufactured metal shelves applied to walls **shall not** be used.

11. **Toilet Room Accessories**

The following accessories are recommended to be furnished in each toilet room (consult district and also correlate with any DHEC requirements).

a. Toilet tissue holder for each water closet.

b. Option of electric hand driers or paper towel dispensers. Use of electric hand driers is encouraged and will probably save appreciable money over a period of time; there is less chance of wastage, of a fire being set, of fixtures being stopped up with resultant service calls, etc. (in larger "gang" toilets, a minimum of two driers should be installed). If paper towels are to be used, furnish metal receptors or district may prefer to furnish metal trash cans (plastic containers are forbidden by DHEC and can be a fire hazard).

c. Soap dispensers are not recommended for individual student toilets or for student or public "gang" toilets. Use of cake soap is permissible by DHEC (soap dispensers may be satisfactory in teachers' toilets and other areas of responsible use).

d. Sanitary napkin dispensers are recommended for all female "gang" toilets, fifth grade and up. Also recommended for all other female toilets, such as those for teachers, public, kitchen employees, etc.

e. Sanitary napkin receptor with hinged cover in all female "gang" toilets, fifth grade and up. Also recommended for all other female toilets. In "gang" toilets, the district should decide as to locating the receptor inside one of the toilet compartments or in the open area.

f. Mirror(s), 24" x 36" in "gang" toilets, number as directed by district. Mirrors **shall** be installed remote from lavatories; also, mirrors **shall not** be visible through door opening because of reflection factor. Stainless steel mirrors are recommended.

g. Coat hook for each toilet compartment.

h. Any other accesssories as directed by district.

i. All accessories **shall** be securely mounted and of as vandal-resistant design as possible. Accessories of stainless steel are recommended.

j. See table in DIVISION 10—PLUMBING for setting heights of accessories and incorporate this information in plans and/or specifications.

12. **Other Toilet Facilities**

a. Teachers' Toilets: There **shall** be a minimum of one per sex per floor. Recommend location near teachers' lounge; they should not open directly into the lounge, however. Provide access from sub-corridor or corridor alcove.

b. Administration/Visitors' Toilets: It is the district's option as to a private toilet for principal, toilet for office administrative personnel, and/or toilet for visitors. These may be located so as to be combined into one, or larger teachers' toilets may be designed to serve for all, if conveniently located.

c. Guidance: See Section 3.04. Consult district.

d. Custodial: It is recommended that a unisex custodial toilet be provided for maids and custodial help. Consult district.

e. Kitchen Employees: A toilet **shall** be provided, to consist of water closet and lavatory and this may be considered as unisex. Should open from a dressing room. At least one additional lavatory for handwashing **shall** be required in the open kitchen area.

f. See Item 13 following for further references.

13. **Other References**

For health unit toilets	See Section 3.06
For individual kindergarten toilets	See Section 3.07
For individual classroom toilets	See Section 3.08
For individual special education toilets	See Section 3.09

14. **Drinking Fountains/Water Coolers**

a. Drinking fountains/water coolers **shall** be provided as follows.

- Corridors (elementary and secondary): A minimum of 1:150 based on design enrollment. However, in elementary schools where some classrooms contain drinking bubblers, this ratio may be modified although each major corridor **shall** have at least one fountain/cooler.
- Cafeterias, "commons," gymnasium dressing rooms, and prevocational agricultural or T & I shops: A minimum of one for each area.
- Gymnasium and auditorium lobbies: A minimum of one for each area, although consideration may be given for more than this, depending on number of persons to be served.
- Any other locations as directed by the district.

b. It is recommended that drinking fountains/water coolers in corridors be located as follows.

- Near gang toilets for convenience and economy of installation.
- Near administrative areas to serve the public.
- Near band/choral rooms (unless the district wishes to locate units **inside** those areas).
- Near the gymnasium because of the student physical activity that takes place there (it is probably unwise to put the units **inside** the gym itself, however).
- To be available to any areas of the building used for after-hours events if other parts of the building are locked off.

c. The installation of exterior drinking fountains for elementary school playgrounds is optional with the district. The vandalism factor should be carefully considered, however.

d. Electric water coolers are recommended for all interior locations, except that units in gym dressing rooms or others placed specifically for use of students during PE activities should be room-temperature drinking fountains.

15. For further plumbing requirements, including hot water stipulations, see DIVISION 10—PLUMBING.

3.14 STORAGE AND CUSTODIAL FACILITIES

1. Except where specifically noted otherwise, the following are recommendations rather than mandates.

2. **Exterior Storage Room**

a. For storage of yard equipment, such as lawn mower and other incidentals, and for storage of duplicating fluids and like combustibles that are not permitted by the Fire Marshal to be kept within the interior of the building.

b. Recommend 100-150 sq. ft., or as directed. Recommend access from the general service area of the kitchen dock.

c. It **shall** have doors opening only to the exterior. Some natural ventilation is recommended.

d. It **shall** have 4-hour rated walls to deck with no roof framing extending through walls. Ceiling construction to be as dictated by SBC requirements for classification and construction.

3. **General Interior Storage**

a. Lack of unallocated general storage space is an almost universal complaint from school principals. Recommend storage wherever possible.

b. Consider chair storage needs for areas that may be used for assembly purposes.

4. **Central Supply Storage**

a. Recommend a central custodial storage area for consumable supplies and an area where minor repairs to equipment can be made.

b. Size should be proportional to enrollment of school and should also relate to the purchasing/distribution policies of the district; 250-500 sq. ft. or even more may be needed.

c. It should have access from the general service area, preferably from the same dock that serves the kitchen. Also needs to open to interior corridor. Recommend 3'-6" single doors, exterior and interior.

d. Shelving and other storage amenities should be as directed by district.

5. **Custodial Office**

a. It is desirable to have a separate area for this, particularly in larger schools. Should be located adjoining central supply storage.

b. Recommend an area of 80-100 sq. ft. and should accommodate desk, filing cabinet, and two or more chairs. Should have telephone.

c. Or may be located in open corner of central supply storage room in smaller schools.

6. **Custodial/Maid Toilet**: Consult the district as to the desirability for separate toilet facilities. Recommend locating near custodial office or central supply storage.

7. **Custodial (Janitor) Closets**

a. There **shall** be a minimum of one per floor but recommend two or more, depending on size and complexity of school. It is often feasible to incorporate a custodial closet at each student gang toilet area.

b. Size: Recommend 40-50 sq. ft. minimum. Should be large enough to store materials needed for several days' operation. Accommodate vacuum cleaner, mop wash cart, and any other equipment specified by district.

c. There should be a floor-type receptor for waste water disposal (rather than wall service sink), with a wall-mounted hot and cold water faucet with vacuum breaker and hose fitting, and 3' length of hose; mount faucet high enough to get water buckets below.

d. Adequate shelving and mop and broom hanging facility should be provided.

e. It is recommended that doors normally swing **out** of the area.

8. **Kitchen**

a. A "housecleaning" facility **shall** be provided for the kitchen area since the cleaning of this area is almost always done by kitchen personnel rather than by a custodian.

b. The cleaning facility may be a separate closet of 25-30 sq. ft. with a floor-type receptor as in Item 7, Paragraph c above, or it may be combined with an inside can wash area with mops hung on the wall.

c. A separate locked cabinet or storage room within the kitchen area **shall** be provided for the storage of poisonous supplies such as drain cleaners, insecticides, rodenticides, etc. Another separate cabinet or storage area **shall** be provided for nonpoisonous supplies such as detergents and sanitizers. The poisonous and nonpoisonous materials **shall** be kept in separate cabinets and/or areas from each other.

9. It **shall** be prohibited for storage and custodial areas to be combined with areas housing mechanical or electrical equipment, except for water heaters mounted on the wall above head-height.

3.15 MECHANICAL AND ELECTRICAL EQUIPMENT ROOMS

1. **General**

a. Areas housing mechanical and/or electrical equipment **shall** be of sufficient size to accommodate the designed equipment and **shall** provide adequate clearances for servicing, repairing, and/or replacing all equipment. Such areas and clearances **shall** meet all requirements of the Standard Building Code as to fire protection, fire prevention, and exit requirements for personnel.

b. Preferably, major mechanical and electrical equipment should each be located in its own room. However, there is no prohibition against locating this equipment in a common room provided no potential hazard is created by doing so (such as locating a boiler or large water heater adjacent to a transformer or main panel or switchboard where safety valves could subject the electrical equipment to steam or water).

- Where mechanical and electrical equipment are combined, the most restrictive fire resistance rating specified under Item 2 below shall apply.

c. Mechanical and electrical rooms **shall not** be combined with, or be a part of, storage or custodial areas.

d. In Item 2 below where no fire-resistant ratings are indicated for ceiling construction, follow the dictates of the SBC for the type of construction and area classification involved.

2. **Mechanical and Electrical Rooms**

a. Boiler rooms, furnace rooms, and other major mechanical rooms **shall** be separated from the remainder of the building by walls having a minimum fire-resistance rating of two hours. It is recommended that no upper floor construction be placed over such areas due to safety and sound transmission, but if the architect elects to do so, then a ceiling/floor assembly having a minimum fire resistance of 2½ hours **shall** be provided.

- Above areas **shall** have doors opening only to the exterior and of such size as to provide for the removal of the largest piece of equipment or the largest demountable portion thereof. Where equipment is excessively large, knock-out wall panels should be provided. The above areas should also be preferably located so that service trucks may be driven to the equipment room door.

b. Other mechanical rooms containing no furnaces, boilers, or major mechanical equipment **shall** be separated from the remainder of the building by walls extending to the deck or floor above, but an hourly rating will not be required except where the fire hazard is increased by the equipment involved, in which case the minimum separation **shall** be one hour or two hours in accordance with the degree of hazard anticipated and/or as required by the Standard Building Code.

c. Rooms or spaces containing the main electrical switchboard, main panelboards, or primary transformer **shall** be separated from the remainder of the building by walls having a minimum fire-resistance rating of one hour and should be located preferably on an outside wall with an outside door so as to be readily accessible. These spaces **shall** meet the requirements of Article 384 of the National Electrical Code and clearances **shall** be provided and maintained as set forth.

d. Rooms or spaces containing secondary distribution panels and/or transformers **shall** be separated from the remainder of the building by walls extending to deck above, but **shall not** require an hourly rating except that spaces containing transformers **shall** meet the fire resistance and ventilation requirements as set forth in Article 450 of the National Electric Code in accordance with the type and location of the transformer installed.

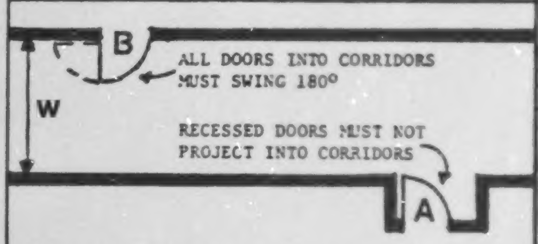
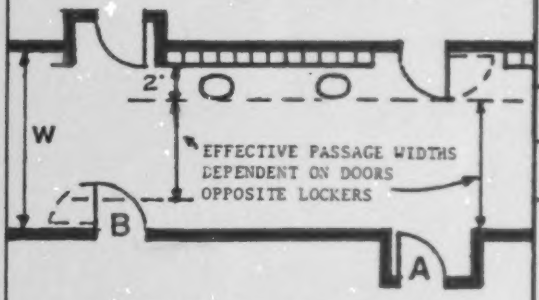
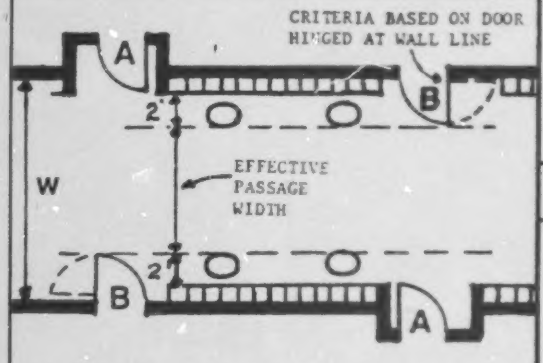
e. Branch circuit panelboards may be located at the discretion of the engineer and **shall not** require separation, but **shall** be located so that the installation is not hazardous to occupants.

f. Fire Alarm Control Panels **shall not** be within any of the foregoing spaces or rooms, but **shall** be located within a locked space and should be in an area convenient to the administrative suite.

3.16 CORRIDORS

1. **Major Corridor Shall** be defined as a corridor that serves more than four instructional areas, or more than 120 students.

   The table below indicates widths of "major" corridors and are recommended minimums, unless exceeded by SBC requirements for units of travel. Diagrams indicate all doors swinging toward or into corridors; however, note from Section 3.22, Item 3, that classoom doors may swing **into** the room as an option. It is imperative in secondary schools that corridors be generally wider because of the need to expedite traffic in the short time between class changes with the attendant locker activity and possible discipline problems resulting from congestion.

	DOOR SWING	TYPE SCHOOL			
TYPE CORRIDOR **W** = width, face to face of walls	**A** = DOORS RECESSED **B** = DOORS SWING INTO CORR.	· ELEMENTARY · CORR. WIDTH		·SECONDARY· CORR. WIDTH	
		A	B	A	B
 B ALL DOORS INTO CORRIDORS MUST SWING 180° W RECESSED DOORS MUST NOT PROJECT INTO CORRIDORS A 1 NO LOCKERS EITHER WALL					
	DOOR SWING A	8'		9'	
	DOOR SWING B		9'		10'
 2' W EFFECTIVE PASSAGE WIDTHS DEPENDENT ON DOORS OPPOSITE LOCKERS B A 2 LOCKERS ON ONE WALL ONLY	When doors are opposite lockers*				
	DOOR SWING A			11'	
	DOOR SWING B				13'
	*WHEN DOORS ARE ON SAME WALL AS LOCKERS, EFFECTIVE PASSAGE WIDTH IS NOT CHANGED SINCE STUDENTS AT LOCKERS ARE THE DETERMINING FACTOR.				
 CRITERIA BASED ON DOOR HINGED AT WALL LINE A B 2' W EFFECTIVE PASSAGE WIDTH 2' B A 3 LOCKERS ON BOTH WALLS	1				
	DOOR SWINGS A OR B*			14'	14'
	*WHEN DOORS ARE ON EITHER OR BOTH WALLS, EFFECTIVE PASSAGE WIDTH IS NOT CHANGED SINCE STUDENTS AT LOCKERS ARE THE DETERMINING FACTOR.				

a. The previous table is for recommended minimum widths. The mandated minimum corridor widths **shall** be 8'-0" for elementary schools and 9'-0" for secondary schools, measured wall to wall, or wall to locker face, or locker face to locker face.

However, to encourage the use of as wide corridors as possible, particularly in secondary schools, it should be remembered that in adding width to corridors, there is no increase in cost at all for such items as millwork, doors, windows, finish hardware, kitchen equipment, plumbing, mechanical, electrical, and other things of this nature, and very negligible additional cost in walls or footings. In actuality, the square foot cost of the additional corridor space will probably not be over one-third the square foot cost of the overall building.

b. In the foregoing table where corridor widths are predicated on recessed doors, this is meant to be applicable to doors of instructional areas and not to custodial, mechanical, storage, or bookrooms, or other areas not customarily used by students.

2. **Minor Corridor**: Is defined as one serving four instructional areas or less, or 120 students or less.

a. Minimum widths for "minor" corridors **shall** be as follows.

Maximum Number of Instructional Areas Served	Maximum Number of Students	Minimum Corridor Widths	
		Elementary	Secondary
4	120	7'	8'
2	60	6'	7'

b. Lockers **shall not** be permitted in minor corridors. Any doors that swing into a minor corridor **shall not** transverse over half the corridor width.

c. Before designating a corridor as a "minor" one, consideration should be given as to the possible need of extending the corridor to serve any future addition whereby it would then need to be a major corridor.

3. **Passageways**: A passageway shall be defined as the access way from rooms or areas not in the main line of travel and not serving as an egress way for more than 30 people (such as access to toilet rooms and access within office suites). Such passageways should be a minimum width of 4'-4".

4. **General**

a. Note from Section 3.22, Item 3, that the district has the option of having classroom-to-corridor doors either swing into, or out of, the classroom. The ideal compromise is to have **recessed** doors that swing toward the corridor, but if the option is exercised to swing the door **into** the classroom, then corridor widths should be determined by the "**A**" columns of the table on the preceding page.

b. Where doors swing into corridors, they **shall** swing a full 180°. Where doors are recessed, they **shall not** project beyond the recess alcove at the 90° position.

c. Where instructional areas are located on opposite sides of a minimum-width corridor and the doors open into the corridor without being recessed, such doors on opposite sides **shall** be offset one from the other by a minimum of 10' (centerline of doors).

d. Administrative areas or other areas with a potential "fireload" **shall not** be open to protected exitways or exit access corridors unless separated from the exitways or exit access corridors by fire-rated walls with protected openings, or unless otherwise protected in a manner permitted by the SBC.

e. The maximum allowable projections of equipment into corridors **shall** be as follows.*

• Fire Extinguisher Cabinets	5"
• Mechanical Units (below 7'-6" off floor)	12"
• Drinking Fountains/Water Coolers*	12"

* EXCEPTIONS MAY BE MADE BY OSP&B IN THE CASE OF DRINKING FOUNTAINS/WATER COOLERS TO ALLOW PROJECTIONS IN EXCESS OF 12" IF CONDITIONS WARRANT, SUCH AS A LOCATION THAT DOES NOT IMPEDE TRAFFIC FLOW OR A WIDER-THAN-MINIMUM CORRIDOR, ETC

3.17 STAIRWAYS (serving as exits)

1. Consult the Standard Building Code for basic stairway requirements.

2. The following modifications to the SBC **shall** also apply.

   a. Interior doors into or out of stairways **shall** be capable of being held in the open position at all times by means of smoke-release devices. Recommend wall-mounted magnetic-release type hold-backs. See DIVISION 12—ELECTRICAL for operational sequences.

   b. Stairways serving as exits **shall** open directly to the exterior. Exceptions to this may be considered by OSP&B provided fire protection meeting SBC requirements is maintained continuously from the stairway to the exterior.

   c. There **shall not** be any storage facilities under stairs or stair landings, or in, or opening to, the stairway itself.

3. For proper traffic flow, the minimum width of any stairway should be as follows, measured from wall to wall if the enclosed type, or wall to outside of stringer if one side is open.

   Elementary Schools: 4'-8" (2½ units of width)

   Secondary Schools: 5'-6" (3 units of width)

3.18 "INTERIOR" CLASSROOMS

1. **Definition**: An "interior" classroom is hereby defined as a classroom or other instructional space that does not adjoin an exterior wall.

2. **Elementary Schools**: Interior classrooms **shall not** be permitted except in the following situations.

   a. For art, music, or resource rooms where students will spend only one or two periods.

   b. For upper-grade classrooms if the district philosophy is for students to change classes in the upper grades.

   c. For "open-plan" classroom complexes if at least two windows are visible from the general area.

   When interior elementary classrooms are permitted, the criteria **shall** meet that stipulated for secondary classrooms below.

2. **Secondary Schools**: Interior classrooms are permitted under the following conditions.

   a. Space **shall** be mechanically ventilated (and preferably cooled) and **shall** be equipped with emergency illumination if there is no natural light or if night use of space is anticipated. See DIVISION 12—ELECTRICAL.

b. Two means of egress **shall** be provided, one of which must open directly to an exit access corridor.*

* ONLY ONE MEANS OF EGRESS WILL BE REQUIRED FROM INSTRUCTIONAL SPACES NOT EXCEEDING 500 SQ. FT. IN FLOOR AREA.

- It is desirable that the second egress also open to a corridor, in which case it **shall** be as remote from the first egress as possible, and preferably on a different wall from the first egress.
- The second egress **shall** be permitted to open to another space (such as a classroom) that preferably in turn has direct egress to a different exit access corridor, in which case a plastic or metal placard **shall** be attached to each side of the door with nonremovable screws stipulating that no lock is permitted and that clear passage must be maintained at all times. However, this arrangement is not generally recommended and should only be used upon specific approval by the district superintendent because of additional sound transmission problems, lack of security from one space to another, and such.
- Note SBC requirements for second egress to open to corridor if occupancy exceeds 50 persons or distance-of-travel exceeds 50'.

c. Refer to DIVISION 7—CONSTRUCTION DOCUMENTS PHASE for recommendations and requirements for extending common walls between classrooms to the underside of floors or decks above.

3.19 FINISH CEILING HEIGHTS

1. Minimum Ceiling Heights

a. Except as otherwise noted herein, the following **shall** be minimum ceiling heights for all areas of new schools.

Elementary: 8'-8", including corridors*
Secondary: 9'-0", including corridors

* CONSULT DISTRICT ABOUT ADVISABILITY OF USING THIS LOWER HEIGHT RELATIVE TO THE FUTURE POSSIBILITY OF THE SCHOOL CLASSIFICATION EVER CHANGING. ALSO THIS LOWER HEIGHT **SHALL NOT** BE USED UNLESS COOLING IS PROVIDED.

b. Where designs are based on exposed decks and exposed structural members, consult OSP&B about the possibility of slightly lower dimensions to the underside of structural members.

c. Where ceiling "paddle" fans may be installed in classrooms, there **shall** be a maximum of 12" from the finish ceiling to the bottommost point of any fan blade.

2. Exceptions to Minimum Ceiling Heights

a. Lower ceiling heights than those mandated under Item 1, Paragraph a above may be permitted in renovation work to existing buildings, upon permission from OSP&B.

b. Classrooms and other instructional areas which are normally under constant supervision may have minor areas of the ceiling furred to 8'-0" minimum for ductwork purposes. It is recommended that taped wallboard or plaster be used in lieu of lay-in tile for such furring, particularly for the vertical surfaces.

c. Band rooms in secondary schools should have a minimum ceiling height of 14'-0" measured from the highest level in the area (if tiered). A height of 18'-20' is recommended, however.

d. Choral rooms in secondary schools should have a minimum ceiling height of 12'-0" measured from the highest level in the area (if tiered). A height of 14'-16' is recommended, however.

e. Gymnasiums in all secondary schools should have a minimum height of 22'-0" from the playing floor to underside of finish ceiling or to the bottom of structural members, whichever is lower.

f. T & I vocational shops should have a minimum ceiling height of 12'-8" to finish ceiling or underside of exposed structure, whichever is lower. Exceptions may be made, depending on the program involved; consult OSP&B.

g. Cafeterias, media centers, auditoriums, and other larger areas shall have ceiling heights as determined by the architect to meet acoustic and aesthetic requirements.

h. Administrative offices, storage rooms, teachers' lounges, and other areas not frequented by students may have lower ceilings at the architect's discretion.

3.20 ENTRANCES

1. General

a. All corridor egress doors or other exterior doors used for substantial student traffic (exception: individual classroom doors) **shall** be protected from the weather, preferably by means of a recess in the building wall, by projecting wing walls with cover, or by covered walkway.

b. Where recesses occur, they **shall** be a minimum of 3'-0" and a maximum of 6'-0" deep, unless otherwise excepted by OSP&B.

c. See Section 3.22 for entrance doorway requirements.

2. Corridor Maintenance

a. The tracking-in of sand and dirt through entrances into corridors is one of the major maintenance problems in schools. Therefore, it is advisable that all entrances handling student traffic be served by sidewalks or paved areas.

b. In the case of entrances from playground areas or others that may not be served by sidewalks, the district may wish to have a large semicircular pad of asphalt or concrete (10' or 15' radius) installed as a buffer. It is recommended that the surface be sloped approximately 3/8" per foot for washing down; recommend provision for wall hydrant in the vicinity if feasible.

c. Removable rubber suction mats laid on the surface in front of doors are generally satisfactory as dirt removers. Open metal grilles in exterior stoops, with catch-areas below, are felt to be generally ineffective and are not recommended.

3.21 COVERED LOADING/UNLOADING

1. Car/Bus Traffic

a. For all schools, it is recommended that car and bus drives be separated, each with its own loading/unloading area.

b. It is further recommended that each loading/unloading area has a covered canopy with covered walkway leading into the building. While desirable for all schools, it is more critical for elementary-age children and should be a part of any building program for that age group.

c. In larger schools, it is recommended that canopies be approximately 50' long so as to serve a minimum of two busses or three cars at one time. Roof of canopy should be 12' wide minimum and roof of walkway to building should be 8' wide minimum.

d. If a canopy roof is to extend out over the edge of busses, consider that the height of the tallest bus in use at this time is approximately 9'-10" at centerline (including air scoop). Columns supporting canopies should be set back from curbs a minimum of 4' to allow for car or bus doors in open position.

e. In elementary schools where budget permits, a large covered area may be provided that serves as a combination bus port as well as a rainy day play area.

2. **Kitchen Service**

a. A covered, or partially covered, dock area is needed for unloading operations.

b. Ideally, the level of the dock should be approximately the level of the "bed" of the vehicles that it serves, although this is often not practical on somewhat level sites. Where raised docks do occur, recommend that **vertical** dock bumper devices be installed to accommodate different bumper heights.

c. A not uncommon occurrence is damage to a building (usually at the roof fascia area) by tall trucks backing up to a dock. The architect should ascertain from the district the type of trucks expected, measure the height and overhang of such typical trucks, and design some device (wheel stops, curb, etc.) that will prevent this type of damage.

3.22 DOORS

1. **General**

a. Except as otherwise noted herein, the content of this section refers to hinged swinging doors.

b. In general, consult the Standard Building Code, but where requirements of this guide vary from the Code, these requirements **shall** govern.

c. Also refer to Section 7.07, Item 4, elsewhere in this guide. Note requirement that fire doors in areas subject to high-use traffic during the school day, including stairwells, horizontal exit doors (usually corridor-to-corridor situations), and any corridor smoke doors, **shall** be capable of being held open by devices which release upon detection of smoke.

d. Gymnasium Dressing Rooms

- All dressing rooms **shall** have two means of egress, although if less than 50 persons occupy any one dressing room and if it is less than 50 feet of travel from the most remote point in the area to an exit, the passage into the gymnasium itself may be considered to be the second egress.
- Entrances to dressing rooms should preferably be directly from a corridor rather than first having to go through the gymnasium itself. Main PE and football dressing rooms should also preferably have exit doors directly to the exterior for access to playing fields. View screens **shall** be provided for all dressing room doors.

e. Exterior entrances to kitchen **shall** be equipped with a fly fan with automatic switch geared to opening and closing of door, unless otherwise waived by OSP&B. Location of fan on interior with air directed down and towards door is preferred but district should be consulted.

2. Door Widths

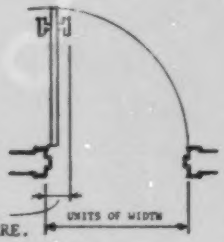
a. All exterior and interior doors **shall** be a minimum of 3'-0" wide, unless otherwise recommended elsewhere in this guide.

b. Maximum widths recommended for exterior doors are 3'-0" for elementary schools and 3'-8" (two units of exit width) for secondary schools.

c. It is recommended that interior stairwell fire doors be made as wide as possible (up to 4'-0" in the case of single doors) to facilitate normal traffic flow between floors. Fire doors or smoke doors in exitways or exit access corridors (exclusive of any fire doors opening from occupied areas) should also be made as wide as possible (up to 4'-0" per leaf) to facilitate normal traffic flow and to maintain aesthetic openness of corridor to degree possible. Note Item 1, Paragraph c, preceding.

d. Units of Width

The SBC stipulates that a "unit of width" related to sizing doors for exit purposes is 22" per unit, plus 12" additional for half a unit. As defined in the Life Safety Code, the width **shall** be measured from jamb to jamb of frame as per diagram.



DISREGARD DOOR STOPS, HINGE STILE, PROJECTION OF DOOR AND DOOR HARDWARE.

3. Door Swings

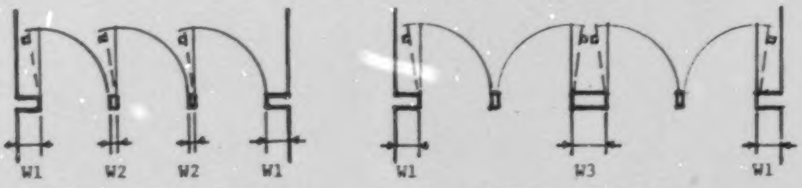
a. Doors **shall** swing in the direction of exit travel where required by Section 1115 of the SBC (this includes, but is not limited to, exit doors to the exterior, and exit doors into or out of stairs and through horizontal exits, from hazardous areas, from areas occupied by more than 50 persons or areas where travel distance within the area exceeds 50 ft.). Also, all doors from media centers, gymnasium dressing rooms, industrial art, prevocational or T & I shops, and from boiler, furnace, mechanical, or electrical equipment rooms **shall** swing in the direction of exit travel.

b. Except for the requirements in Paragraph a preceding, all other doors may swing into, or out of, the areas they serve, including classrooms. In the case of classrooms, it is **preferable** that the door swing toward the corridor (the direction of travel), but there is the obvious disadvantage of traffic disruption and, therefore, the option as to the direction of swing will lay with the district; however, it is recommended that the ideal compromise would be to have **recessed** doors that swing toward the corridor. See Section 3.16.

All doors to the classrooms in any one school **shall** swing in the **same** direction (i.e., either into or out of) unless otherwise waived by OSP&B. In the case of an addition to an existing building, consult OSP&B.

c. In multiple openings, two doors should not be hung back-to-back on the same mullion, although a single mullion is usually acceptable as the only separation between the hinge side of one door and the strike side of another. Allow reasonable separation between doors to allow for backswings; see following diagrams for recommended clearances.

RECOMMENDED SEPARATION OF MULTIPLE DOORS WITH CLOSERS



MULTIPLE SINGLE DOORS

MULTIPLE PAIRED DOORS

(See next page for dimensions)

Location	Minimum Dimension for 95° Door Swing	Minimum Dimension for 105° Door Swing	Remarks
W1	6"	12"	*105° swing is always preferred to minimize strain on door closers
W2	2"	2"	
W3	12"	24"	

d. Where a floor-mounted closer is used with a built-in stop in the closer itself and a coordinated stop at the top, surface-applied floor or wall stops are not deemed necessary if a 95° door swing, or preferably 105° swing, is specified.

- Where overhead closers are used with exterior doors, surface-applied floor stops, or equivalent, should be specified.

4. **Exterior Doors** (SEE SECTION 3.23. ITEM 4. CONCERNING DOORS THAT OPEN INTO INTERIOR COURTS)

a. Aluminum doors and frames for exterior openings should be used only after careful analysis of hardware specifications, as there have been unsatisfactory installations in this regard due to abuse.

b. Metal (steel) doors are generally recommended for all exterior locations (there might be some exceptions in coastal locations where salt air could be corrosive). Tops of doors should be flush contour.

c. Where paired doors occur in exterior walls in traffic situations, it is recommended for security reasons that each door be in its own frame, or that fixed mullions separate the leaves, rather than using a removable mullion. However, there should be at least one pair of corridor or lobby doors **with** a removable mullion, which is convenient to vehicular access to allow for passage of large objects into the building.

d. Where doors occur in exterior walls and no weather protection is provided (mechanical or storage rooms for example), generous metal drip should be provided on head of door frame to protect top of door from moisture.

5. **Interior Doors**

a. Fire doors (20-minute rated)

- The 1982 SBC requires a minimum of 20-minute label fire doors and frames for doors in the 1-hour rated walls of exit access corridors. Solid core 1¾" wood doors bearing the 20-minute label are recommended for this installation. Wood doors **shall** be five-ply staved wood lumber core with continuous wood blocking with no voids in core and **shall** meet National Wood Manufacturers Association Industry Standard 1-78 and Architectural Woodwork Institute Type SLC requirements.

b. Fire doors (3/4-hour rated or more)

- Metal fire doors are recommended in general as they offer the best variety of solutions to labeling and panic device requirements. Mineral core wood fire doors are not recommended due to past history of fitting and hinging problems, and additional possible maintenance problems (if they are used, surface hinges and through-bolting of all hardware is a must).
- Before 1981 NFPA 80 came into effect, astragals were required on certain fire doors where used swinging in pairs without mullions, as follows.

A-Label 3-hour metal fire doors (astragals were not required on lesser rated metal doors).

All ratings of mineral core wood fire doors.

The 1981 NFPA 80 has now banned the use of astragals that **inhibit** the free use of both leaves on paired doors within a means of egress.* Therefore, until manufacturers can offer approved tests on the above listed classes of fire doors without astragals, it is recommended that either a mullion be used, or if no mullion is desired, hardware shall be selected in conjunction with astragals so that it is always possible to open either door in the direction of travel.

* THIS DOES **NOT** APPLY TO PAIRS OF "DOUBLE EGRESS" FIRE DOORS WHERE ONE DOOR OF A PAIR SWINGS ONE DIRECTION AND THE OTHER SWINGS OPPOSITE.

- Glazing in all fire doors (and including 20-minute label doors) **shall** be rated wire glass set in **metal** stops, sizes limited as per Standard Building Code. Open grilles **shall not** be allowed except as a part of an assembly that has been tested by a recognized testing laboratory.

c. Where mullions are used for interior paired doors, the removable type is recommended to facilitate passage of large objects throughout the building.

d. In multistory buildings, thought should be given to the necessity of moving large objects from one floor to the other.

6. **Roll-down or Folding Doors or Grilles**: These **shall not** be allowed where their use negates required exitways or exit access corridors, or where dead-end corridor violations result. This prohibition **shall** be in effect, regardless of whether or not the district intends to only close such doors or grilles after school hours.

3.23 WINDOWS

1. **General**

a. For energy conservation, glass areas should be kept to a minimum. Kindergarten classrooms may be an exception (See Section 3.07, Item 3, Paragraph f).

b Monumental grade aluminum windows are generally recommended for school use. Use of windows that require painting should be avoided.

c. Glazing should be done with snap-in bead-type retainers or with other similar systems. Glazing compound or putty should not be used as the sole means of glazing due to potential vandalism.

b. See DIVISION 11—MECHANICAL for ventilation requirements where air conditioning, mechanical, or natural ventilation is utilized.

2. **Required Windows**

a. Each classroom or other instructional area adjoining an exterior wall **shall** have a minimum of one window unless otherwise waived by OSP&B. This required window **shall** have a ventilating section with a minimum of 6 sq. ft. opening in the clear.

b. Where classrooms or instructional areas have a door directly to the outside, the minimum of one window **shall** still be required.

3. **Windows for Emergency Egress**

a. Except as noted, there **shall** be at least one window that qualifies for emergency egress in any space where windows are required under Item 2, Paragraph a preceding, including those on all floors of multistory buildings. However, if there is an egress door directly to the outside, the required window need not qualify as an emergency egress.

b. If there is more than one window in an area, all do not have to qualify for emergency egress, but those that do **shall** have a plainly visible plastic or metal placard stating "emergency exit"; the placard **shall** be riveted or attached to the window with nonremovable screws. If all windows qualify for egress, placards are not required.

c. The following window types are permitted for egress.

Single- or double-hung · Casement · Sliding

- Projected windows are generally not preferred and **shall** only be used where the escape portion opens to at least 45° and the size of the opening is as stipulated under Paragraph d hereafter. Sliding windows are also generally not preferred because of dirt collecting in tracks.

- Aluminum casement windows have given problems from sagging in the open position and it is recommended that their width not exceed 2'-4".

d. Size of egress openings

- For a single- or double-hung, casement, or sliding window, there **shall** be a minimum of 6 sq. ft. opening in the clear, with a minimum clear dimension of 24" in either direction.

- If projected windows are used, they **shall** have a minimum clear sash opening of 32" wide and 40" high, and not less than 6 sq. ft. clear passage under the sash when the sash is at 45° open position.

e. Heights from floor to bottom of egress opening*

*WHERE IT IS DESIRABLE TO HAVE CABINETS UNDER WINDOWS. CONSULT OSP&B FOR POSSIBLE EXCEPTIONS TO MAXIMUM HEIGHTS LISTED

	Elementary	Secondary
First floor: Minimum	4"	4"
First floor: Maximum	2'-8"	3'-0"
Second floor and above: Minimum	2'-6"	2'-6"
Second floor and above: Maximum	3'-0"	3'-0"

f. Locking: Egress openings **shall** have a one-point locking release, preferably within reach of the age of the student served, but in no case higher than 5'-8".

4. **Windows (or Doors) Opening to Interior Courts**

a. Where required first-floor emergency egress windows or egress doors open to interior courts, the court **shall** have access to a protected passageway which leads to the open area outside the building, except as noted otherwise under Paragraph b following. Refer to SBC Section 1112.

b. Where a protected passageway cannot be provided out of a court, or in the case of rooms above the first-floor level, the classrooms or other instructional areas bordering the court **shall** be considered the same as if they were "interior" classrooms and **shall** meet the requirements of Section 3.18.

5. **Where Windows Are Not Recommended**

a. In areas requiring more-than-normal security, such a food dry storage rooms, bookrooms, AV storage, general and athletic storage, T & I vocational shops or other vocational-related areas where tools and equipment are present, band instrument storage rooms, etc.

b. In toilet rooms and gymnasium dressing rooms (mechanical ventilation is mandated for these areas) and in gymnasiums.

6. **Window Screens**

Shall be required for any operable windows in cafeterias, kitchens, or in toilet rooms (although windows are not recommended in the latter). May be used elsewhere if desired, but it should be remembered that screens are easily vandalized. If used on emergency egress openings, screening **shall** be of a type that can be easily pushed out.

3.24 LOCKERS

1. **General**: This section is concerned with general student lockers. Specialized lockers, such as for gym dressing rooms and for vocational shops, are covered under those sections.

2. **Types of Lockers**

   a. Double-tier 12" x 12" metal lockers are normally recommended, considering the factors of cost economy and floor space. Triple-tier lockers have been used in some cases, but they are not recommended due to the additional congestion of students.

   b. Combination locks are preferred for quietness and aesthetics, rather than padlocks.

   c. Sloping tops are recommended for all lockers where they are not recessed into walls.

   d. Acoustic-type lockers are recommended in all cases to reduce the noise level. The additional cost of 20-25 percent is of course a factor in most school budgets, but the district should at least consider having the architect specify these as an "alternate" item in the bid.

   e. Metal bases for lockers should not be used; recommend concrete or wood with finish surface same as remainder of corridor.

3. **Locker Layouts**

   a. Lockers are normally placed against corridor walls or, as an option, grouped in locker "alcoves." Opinions vary sharply as to the preferred location. Which type of layout is the more economical of space is also debatable and would need individual analysis by the architect.

   b. Corridor Location: Lockers may be installed on either or both sides of corridors. One-sided location is preferred to help decentralize congestion and is probably more economical of space (see Section 3.16).

   c. Locker Alcoves: These are normally designed as an open alcove or recess off the main corridor system. Lockers should be installed on available walls and in double-faced "islands" with the islands always perpendicular to the corridor side for maximum exposure.

      - The main objection that many administrators have to this arrangement is the extreme concentration of students and the difficulty of maintaining adequate supervision. This may be somewhat countered in larger schools by placing an assistant principal's office in the immediate area, with a glass viewing panel overlooking as much of the alcove as possible.

      - In a locker alcove, the aisle width between faces of opposing lockers **shall** be 5'-6" minimum, with 6'-0" preferred.

3.25 VOCATIONAL FACILITIES

1. General

a. There are many considerations involved in the design of vocational facilities, such as laboratory sizes related to number of students to be served, quantity and size of equipment involved, number of teachers, method of instruction, and safety factors.

b. More detailed information on recommended sizes, layout, and equipping of all vocational facilities is contained in the document *Vocational Education Facilities Planning Guide;* this document is available from the Consultant for Construction, Office of Vocational Education, Room 910, Rutledge Building, Columbia, South Carolina 29201.

c. For general information, the following curricula are considered to be under the general heading of vocational subjects and as such are discussed in the above-mentioned publication.

Agriculture
Production Agriculture
Agriculture Mechanics
Ornamental Horticulture and Floriculture

Business Education
Recordkeeping, Accounting, Business Math
Typing I and II
Business Communications, Shorthand, Office Procedures
Word Processing/Data Processing
Business Law, Introduction to Business, Business Principles and Management

Health Occupations
Clinical Lab

Marketing and Distributive Education

Home Economics

Home Economics Occupational
Housing and Home Furnishings Services
Food Services
Child Care
Institution and Home Management
Clothing Management, Production, and Services

Industrial Arts

Prevocational Education

Trades and Industry
Air Conditioning, Refrigeration
Appliance Repair
Auto Body Repair
Auto Mechanics
Auto Service
Barbering
Building Construction
Business Machine Maintenance
Cabinetmaking
Commercial Art
Cosmetology
Diesel Mechanics
Drafting
Electricity
Electronics
Graphic Communications
Industrial Mechanics
Industrial Sewing
Machine Shop
Masonry
Plumbing
Radio and Television Service
Sheet Metal
Small Engine Repair
Tailoring
Textiles
Tile Setting
Welding

DIVISION 4 BARRIER-FREE DESIGN

4.01 INDEX OF SECTIONS INCLUDED IN THIS DIVISION

Section Number and Title		Page
4.02	Definitions	4-1
4.03	General	4-1
4.04	Federal Requirements	4-2
4.05	Authority To Review	4-2
4.06	Other References	4-2

4.02 DEFINITIONS

1. Refer to definitions under Section 1.03, Items 1 through 9. Note in particular the paragraph concerning mandates vs. recommendations.

4.03 GENERAL

1. South Carolina enacted legislation (Act 1191) in 1974 which created the State Board for Barrier-Free Design. This board has established its rules and regulations, including a building design standard for making buildings accessible to the handicapped.

2. The "Rules and Regulations for Making Building and Facilities Accessible to and Usable by Physically Handicapped People" is available to design professionals and other interested persons or groups free of charge from:

Division of General Services
Barrier-Free Design Section
300 Gervais Street
Columbia, South Carolina 29201

3. **Special Considerations**

   a. PE Facilities: **Shall** be accessible to the physically handicapped, including toilet and shower areas (not required in varsity athletics).

   b. Stage Areas: **Shall** be accessible to the physically handicapped unless otherwise waived by OSP&B.

   c. Science Laboratories: **Shall** have a minimum of at least one work top set at height to serve the physically handicapped. This top may be a portable table and should be located near a work sink (it is not required that the sink itself be at the lower level, however).

   d. Art Rooms: No special work surfaces are required for the physically handicapped as portable tables should serve adequately.

   e. Band Rooms: It is recommended that floors be flat rather than with tiered risers to avoid the problem of access by the physically handicapped.

   f. Home Economics Areas: For the food preparation curriculum, one unit kitchen **shall** be designed to serve the physically handicapped. One worktop containing a sink, rangetop and work space **shall** be at 32" with a minimum of a 24" wide work space that has a clear opening of 29½" high for wheelchair access. A wall oven **shall** also be provided adjacent to the worktop with bottom of the oven door at 32" above floor; a dishwasher would not be required in this unit kitchen.

4.04 FEDERAL REQUIREMENTS

1. Users of the above-mentioned manual are cautioned not to confuse the required state building design standard (Section 508 of the Standard Building Code, modified) with Section 504 of the Rehabilitation Act of 1973 (federal). These state and federal regulations are clearly separate requirements, and OSP&B has no authority for review or enforcement of the federal regulations.

2. Where applicable, the dual state and federal program and design requirements should be closely coordinated by architects and districts when planning public school facilities.

4.05 AUTHORITY TO REVIEW

1. The Director, OSP&B, is the only special review agent with delegated authority from the State Board for Barrier-Free Design to review and approve all public school facilities. This authority includes the consideration of exceptions and the approval of design waivers.

2. See DIVISION 13—SAMPLE FORMS for request of waiver or appeal form.

4.06 OTHER REFERENCES

1. See DIVISION 3—DESIGN CRITERIA for mention of barrier-free design in the following sections.

Section 3.06	Health Units
Section 3.07	Kindergartens
Section 3.08	General Classrooms
Section 3.09	Special Education
Section 3.13	Toilet Facilities

2. See DIVISION 10—PLUMBING for table "Working Heights for School Fixtures and Equipment." Generally, heights and sizes of fixtures and accessories have been standardized to serve both the handicapped and nonhandicapped.

DIVISION 5 EMERGENCY PREPAREDNESS

5.01 INDEX OF SECTIONS INCLUDED IN THIS DIVISION

Section Number and Title	Page
5.02 General	5-1
5.03 Reference Agencies and Standards	5-1
5.04 Shelter Considerations in New Buildings	5-1
5.05 Seismic Design in New Buildings	5-2

5.02 GENERAL

1. This division deals with all phases of emergency preparedness as related to disasters and emergencies, both natural and man-made.

2. There is a South Carolina "Comprehensive Disaster Preparedness Plan" which utilizes all of the state agencies and public-owned facilities. The authority for this plan was granted in Act No. 199, July 30, 1979, Acts and Joint Resolutions of the General Assembly of the State of South Carolina. The Emergency Preparedness Division, Office of the Adjutant General, is charged with implementing this plan. The Department of Education is charged with coordinating the use of U.S. Department of Agriculture food stocks within school lunch programs and assisting in facilitating the utilization of school facilities for shelter and feeding.

5.03 REFERENCE AGENCIES AND STANDARDS

1. **General**

South Carolina Comprehensive Disaster Preparedness Plan
Emergency Preparedness Division
Rutledge Building, 1429 Senate Street
Columbia, South Carolina 29201

2. **Nuclear**

Federal Emergency Management Agency
Washington, D. C. 20472

Note: The above agency may be contacted for the latest publication list as related to fallout shelter design and federal assistance programs. Typical publications are listed below.

Standards for Fallout Shelters. TR-81
Architectural Design Techniques for Fallout Protection and Energy Conservation. TR-86
Protective Construction. TR-39

3. **Seismic**

South Carolina Geological Survey
Harbison Forest Road
Columbia, South Carolina 29210

5.04 SHELTER CONSIDERATIONS IN NEW BUILDINGS

1. It is recommended that districts give serious consideration to providing disaster shelter in the design of all new schools. If this is taken into account in the initial design stages, such areas can be provided in many cases at modest or little additional cost and is often

as simple as arranging the building configuration in such a way as to provide protection, as well as serving the normal educational functions.

2. For natural disasters, shelter protection simply means providing areas for large numbers of people to eat and sleep for a relatively short time on an emergency basis.

3. For man-made disasters, such as nuclear explosion, protection from an actual explosion itself is definitely not within the realm of practicability, but it is recommended that providing protection from radiation fallout be considered.

   Fallout protection is generally obtained by means of mass (such as solid walls or fire walls, concrete block walls filled with sand, reinforced concrete, earth, and the like) and by location, such as using central areas within the building like corridors or other spaces not bordering on exterior walls, or protected first-floor areas of two-story buildings. Also, excellent protection can be gained by the use of exterior earth berms or other grading configurations.

4. In all shelters, consideration should be given for such as adequate lighting, ventilation, food storage and preparation, and water and sanitary facilities during emergency situations.

5.05 SEISMIC DESIGN IN NEW BUILDINGS

1. Section 1207 of the Standard Building Code states the design requirements, and Figure 1207.1 indicates in a general way the parts of South Carolina that are considered to be subject to earthquake risk as determined by past experience. Seismic design **shall** be mandatory where required by local authorities, but is not mandated by OSP&B otherwise. It is nevertheless recommended that the district instruct their architect to give consideration to this factor when designing a school that will be within an area considered to be a seismic zone.

2. If seismic considerations are taken into account in the early design stages, it may be possible to choose a type of construction that resists seismic forces with minimum additional cost, such as one-story construction, or two-story steel-frame buildings in lieu of unreinforced masonry, etc.

3. The South Carolina Geological Survey may be contacted for further assistance.

DIVISION 6 SCHEMATIC AND DESIGN DEVELOPMENT PHASE

6.01 INDEX OF SECTIONS INCLUDED IN THIS DIVISION

Section Number and Title		Page
6.02	Definitions	6-1
6.03	Curriculum Consultants	6-1
6.04	Preliminary Information Form	6-2
6.05	Schematic Plan Submittal	6-2
6.06	Design Development Submittal	6-2
6.07	Additions to Existing Buildings	6-5
6.08	Plan Review Procedure	6-5

6.02 DEFINITIONS

1. Refer to definitions under Section 1.03, Items 1 through 9. Note in particular the paragraph concerning mandates vs. recommendations.

2. **Schematic Design Phase**: Study by the architect of project requirements, followed by the preparation of schematic design drawings with supporting data as hereinafter outlined. (Submittal of this phase is optional with the architect and/or district superintendent.)

3. **Design Development Phase**: Preparation of more detailed preliminary drawings along with supporting data, all as hereinafter outlined. Note that the definition of "design development" as used herein is not meant to be as inclusive as defined in some AIA documents in that development of structural, plumbing, mechanical, and electrical elements is not required.

6.03 CURRICULUM CONSULTANTS

A district superintendent may request recommendations and/or reviews by the various curriculum consultants in the Department of Education. Their use is recommended but not mandated.

1. **Prior to Plan Preparation**

   a. If the superintendent desires recommendations in the formative stage before the architect has begun drawings, he should contact the Chief Supervisor, Curriculum Development Section, South Carolina Department of Education.

   b. In some cases it may be feasible for consultants to come to the district, but likely it will be more practical for the architect and superintendent to visit the Department of Education on a day when all applicable consultants are available for individual conferences.

2. **At Submittal of Schematic and/or Design Development Plans**

   a. If the district superintendent desires reviews by any or all applicable Department consultants, he **shall** submit the form "Request for Plan Review by Department of Education Consultants" so stating. The form shall accompany each plan submittal, or may be sent several days in advance to facilitate the arranging of a conference schedule.

   b. See DIVISION 13—SAMPLE FORMS

3. **Review by Outside Agency**

   In the realm of vocational facilities, a cosmetology unit **shall** have the design development plans approved by the South Carolina State Board of Cosmetology Examiners

(1209 Blanding Street, Columbia, South Carolina 29201), and the architect **shall** be responsible for forwarding plans to this agency for review with copy of transmittal letter to OSP&B.

6.04 PRELIMINARY INFORMATION FORM

1. The Preliminary Information Form is contained in DIVISION 13—SAMPLE FORMS. The purpose of this form is to serve as a mini-educational specification for the benefit of OSP&B and Department curriculum consultants for review of plans.

2. The form **shall** be submitted with the schematic plan submittal if that option is elected, or otherwise with the design development submittal. It is not necessary to submit at both times unless information originally shown with the schematic submittal is no longer valid at the design development phase.

6.05 SCHEMATIC PLAN SUBMITTAL (Optional)

The schematic plan submittal is not mandatory but is optional to the architect and/or district superintendent. Schematic plans, if submitted, may be single copy (unless additional sets are needed for curriculum consultants), and **shall** consist of the following.

1. **Site Plan**

   a. Should show entire site plan with building layout, drives, parking areas, walks, playing fields, and other such basic data.

   b. Topographical information is optional with the architect.

2. **Floor Plan(s)**

   a. Should be at appropriate scale (1/16" preferably), drafted accurately, indicating doors and windows.

   b. Should indicate names of areas and show in small rectangular block the square footage of each main area. Show grade classification for elementary classrooms.

   c. It is recommended that the architect submit a building code analysis, although this is not mandatory.

   d. It is not necessary to show equipment and/or furnishing layouts.

If an architect utilizes a "computer-aided" design approach to planning, consideration will be given by OSP&B on an individual basis concerning schematic and/or design development plan submittals.

6.06 DESIGN DEVELOPMENT SUBMITTAL (This **shall** be mandatory.)

The design development submittal may be single copy (unless additional sets are needed for curriculum consultants), and **shall** consist of the following.

1. **Site Plan**

   a. Include small location map that relates the site to the surrounding locale (needed to determine ETV antenna requirements).

   b. Show the entire site plan at suitable scale. Indicate all topographic information with existing and proposed finished grades, boundary lines, wooded areas, orientation, site acreage, existing utilities, including fire hydrants, and other pertinent data.

c. Indicate drives, parking areas, walks, playing fields, highways, etc.

d. Indicate building location, floor grade level, areas of future anticipated expansion, etc.

e. Indicate source of water, gas, electric, or sewage facilities.

f. In cases of additions to existing buildings, or new buildings added to an existing school complex, all of the above information should be shown, including the entire site plan and indication of all existing buildings with floor grade elevations shown. However, total topographic information will not be required and may be limited at the architect's discretion to the general area of the site where new construction or other changes occur.

2. Floor Plans

a. At appropriate scale (1/8" preferably). If entire plan cannot be shown on one sheet, prepare smaller scale (1/16" preferably) overall plan along with larger scale partial plans to form the whole.

b. Indicate names of areas and show in small rectangular block the square footage of each main area. Show grade classification for elementary classrooms.

c. Indicate windows, doors, and door swings.

d. Indicate on floor plans all built-in cabinetwork, sinks, chalkboards, tackboards, lockers, and other like features. Where classrooms are repetitious, chalkboard and tackboard may be indicated as typical in just one space.

3. Exterior Elevation Drawings

Show all sides. To be at convenient and readable scale.

4. Equipment and/or Furnishing Layouts

a. Indicate on not less than 1/8" floor plans (unless otherwise waived by OSP&B), equipment and furnishing layouts to include areas as follows.

Art
Auditorium Seating
Gym Seating and Dressing Rooms
Home Economics
Media Center
Science
Business and Office Occupations
Cosmetology
Health Occupations
Industrial Sewing
Industrial Maintenance Mechanics
Welding

- With the exception of the media center layout, portable equipment or furnishings that are not directly related to utility requirements need not be indicated.
- Identify various items by name and give other pertinent data.

b. Indicate on a separate 1/4" scale drawing equipment layout for kitchen areas, including kitchens in connection with vocational curricula. Include an itemized legend of equipment with all layouts.

c. Note from Section 6.03 the requirement to submit cosmetology layout to the South Carolina State Board of Cosmetology Examiners.

5. Cross-Section Drawings

a. Diagrammatic-type drawings are sufficient without undue detail. Indicate ceiling heights, roof slope, general structure, etc.

b. At appropriate scale (1/8" or 3/16" preferably).

c. Cross-sections **shall** be included so that all major elements of the building are shown.

6. Building Code Analysis

Building Code compliance is the responsibility of the architect as the representative of the district and an outline Code analysis **shall** be incorporated into the drawings for review. See DIVISION 13—SAMPLE FORMS for suggested forms to use, or the architect may revise to suit the individual job. Submitted data **shall** set forth all pertinent Code requirements, including the following.

a. Date of Standard Building Code and amendments thereto in effect at the time of submittal of design development drawings (Example: 1979 Standard Building Code, 1981 Amendments). The issue of the Code in effect at the time of the submittal of design development drawings **shall** establish Code requirements for the remainder of the project, including the construction phase.

b. Construction classification (Example: Type IV — 1-hour Protected, etc.)

c. Occupancy classification of the various parts (Example: Educational, Large Assembly, etc.).

d. Where area limitations occur due to construction classification, indicate fire wall separation on drawings and submit area calculations (either on the drawing or on separate form).

e. Indicate all fire walls or fire-rated walls by color-coding as follows.

4-hour wall = red

2-hour wall = green

1-hour wall = yellow

In lieu of color-coding, architect may substitute another type of legend of his choice.

If the project is of such size that there is a smaller scale master plan in addition to larger scale partial plans, show fire walls and other Code data on the master plan.

f. Indicate all fire-rated doors by putting small figures at applicable door openings as follows.

3	=	3-hour		A-label fire door
1½	=	1½-hour	B- or	D-label fire door
1	=	1-hour		B-label fire door
¾	=	¾-hour	C- or	E-label fire door
20	=	20-minutes	C- or	E-label fire door

g. When the type of construction selected requires fire walls, fire-rated walls, or fire-rated assemblies, specific reference is made to the SBC, Chapter X, "Fire Resistance Standards for Materials and Construction."

Resistance ratings **shall** be based on specific assemblies that have successfully performed under tests made by an approved laboratory (such as U.L., Factory Mutual, Warnock Hersey, etc.), except that if the architect finds that the design requires materials or construction other than that shown in a specific assembly, reference is made to the SBC, Section 103, subsection entitled "Alternate Materials and Alternate Methods of Construction." Under this option the burden of proof of the fire rating rests with the architect.

It is recommended that assemblies be chosen or alternate methods proposed and so indicated at the design development stage or, at the option of the architect, this may be delayed until the construction document stage. If the latter, it is recommended and is urgent that the architect seek concurrence of OSP&B before finalization into working drawings.

h. In the case of an addition to an existing building, 4-hour wall separation **shall** normally be provided between the new and existing unless the architect can validate that this would not be required by the SBC.

6.07 ADDITIONS TO EXISTING BUILDINGS

1. **Plans of Existing Buildings**

   a. If the architect has access to original tracings or has extra prints, he should include with his submittal one print of site plan, floor plans, elevations, and sufficient sectional information to show general construction. Also, indicate on existing plans where additions are to be added.

   b. If the above data is not available and OSP&B does not have microfilm records on file, the architect should furnish enough schematic plan drawings of the existing building to facilitate a Code analysis of the overall complex. Also, a detailed count of all student toilet fixtures in the existing building **shall** be furnished.

2. **Photographs of Existing Buildings**

   a. If plans of the existing building as in Item 1 preceding are not available and OSP&B does not have microfilm records on file, it would be helpful if the architect would submit photographs of all sides of the existing building with an indication of the area where the addition is to be made.

   b. Professional photography is not necessary, but the photos should be clear and large enough to show existing detail in reasonable manner.

6.08 PLAN REVIEW PROCEDURE

1. The OSP&B will review for compliance with applicable building codes and regulatory or statutory requirements and may also make general advisory recommendations providing time of review is not lengthened. Review of building code and regulatory or statutory requirements by OSP&B **shall not** relieve the architect, as representative for the district, from ultimate responsibility in this regard.

2. Plan reviews in most cases will be done on a personal basis with the architect and a representative of the school district. In the case of a small project, it may be possible to accomplish the review by telephone.

3. After each review, a decision will be made as to the necessity of further resubmittal of corrected plans. This will depend on the complexity of the job and the changes required.

4. After completing the review of design development drawings, verbal authorization will be given by OSP&B to the architect to proceed into the construction documents phase and this will be followed by written confirmation. The architect **shall** be held responsible if he proceeds without such authorization.

7.01 INDEX OF SECTIONS INCLUDED IN THIS DIVISION

Section Number and Title		Page
7.02	Definitions	7-1
7.03	AIA—AGC Joint Recommendations	7-1
7.04	General	7-1
7.05	Specifications—Special Conditions	7-5
7.06	Membrane Roof Systems	7-10
7.07	Finish Hardware	7-15
7.08	Carpet	7-17
7.09	Folding Gymnasium Seating	7-20
7.10	Construction Documents Review Procedure	7-21
7.11	Alternate Methods of Construction	7-23

7.02 DEFINITIONS

1. Refer to definitions under Section 1.03, Items 1 through 9. Note in particular the paragraph concerning mandates vs. recommendations.

2. **Construction Documents Phase**: Consists primarily of the final drawings, specifications, and bidding documents.

7.03 AIA—AGC JOINT RECOMMENDATIONS

1. It is recommended that the architect consult the "Architect-Contractor Joint Recommendations of South Carolina Chapter, AIA and Carolinas Branch, AGC" as a procedural guide related to the following.

Rec. No. 8	Retainage
Rec. No. 11	Uniform Construction Index
Rec. No. 13	Supplemental Hold Harmless Clauses
Rec. No. 15	Door Numbering and Scheduling
Rec. No. 17	Unit Prices
Rec. No. 21	Unusual Specialties
Rec. No. 24	Inspection and Lab Tests
Rec. No. 26	Alternates
Rec. No. 29	Interpretation of Documents
Rec. No. 31	Guarantees and Warranties

2. A copy of the above publication may be obtained from the Building Division Manager, Carolinas Branch, AGC, 1100 Euclid Avenue, Charlotte, North Carolina 28203.

7.04 GENERAL

1. See DIVISION 3—DESIGN CRITERIA for various requirements affecting preparation of final drawings and specifications, including construction requirements for records rooms/vaults, "interior" classrooms, toilet facilities, mechanical and electrical rooms, doors, windows, and others.

2. **Authorization**: See Section 6.08, Item 4, concerning approval from OSP&B before proceeding into construction documents phase.

3. **Completed Documents Required**: Incomplete plans and/or specifications **shall not** be submitted to, nor accepted by, OSP&B.

4. **Use of Professional Engineers**: See Section 1.06.

5. **Seals**: In accordance with state regulations, **each** print of the final drawings and the title page of each set of specifications **shall** be identified with the architect's seal. In addition, the seals of any landscape architect, and structural, plumbing, mechanical, and electrical engineers **shall** be placed on the prints encompassing their work.

6. **Consultants**: It is recommended that the architect and district consider use of the following independent consultants where applicable to supplement basic architectural services.

   a. Acoustical Engineer: For noise-problem areas such as music facilities, auditoriums, and gymnasiums.

   b. Roof Consultant: To review roof system design, detailing, and specifications.

   c. Kitchen Consultant: For kitchen equipment layouts.

   d. Carpet Consultant.

7. **Energy Conservation**

   a. The entire design, including architectural, mechanical, and electrical portions, **shall** be designed in accordance with South Carolina Energy Efficiency Standard Act, Appendix J of the Standard Building Code, and ASHRAE and other standards listed in Divisions 10, 11, and 12.

   b. For further specifics, refer to Section 10.12, Sections 11.05 and 11.09, and Sections 12.05 and 12.18.

8. **Soil Tests**

   a. It is recommended that projects of consequence have prior soil tests made in the proposed area of construction by a testing laboratory.

   b. If tests are made, location of test holes **shall** be shown on drawings and associated test data **shall** be incorporated in the contract documents or else kept available on file.

9. **Fire Protection Systems**

   a. All fire protection systems **shall** be in accordance with the requirements of the Standard Building Code, Chapter 18 of the Standard Fire Prevention Code, and appropriate NFPA standards.

   b. Included in this general heading are building sprinkler systems, protection for kitchen hoods, paint spray booths and computer installations, and portable fire extinguishers (see Sections 11.07 and 11.08 of this guide in reference to paint spray booths and kitchen hoods).

   c. Types of portable fire extinguishers and their distribution are dependent upon the "class of fire." Refer to NFPA Standard 10 as follows.

      Chapter 1: Fire Classes A, B, C, and D
      Chapter 2: Selection of Extinguishers
      Chapter 3: Distribution of Extinguishers

      Also refer to Appendices A through G of the above standard for further detailed information.

10. Fire Walls and Fire-Rated Walls

The following SBC mandates **shall** be included in the contract documents.

a. Section 705 requires that all fire walls and fire-rated walls have to be completely fire-stopped and draft-stopped, including complete sealing against underside of floors or roof decks where this condition occurs. While not mandated, it is recommended that **any** wall which extends to a floor or deck be so sealed to prevent spread of fire or smoke.

b. Section 702 also requires that all fire walls and fire-rated walls be permanently identified with signs or stenciling above decorative ceilings and in other concealed areas. See suggested wording in Code.

11. Walls Between Classrooms

It is recommended that common walls between classrooms be extended to the underside of floors or decks above, for sound-stoppage as well as fire and smoke control, where the height to be extended is not significant. Where the height is significant (i.e., in the case of pitched roofs), it is recommended that at least the wall of every fourth classroom be extended up for fire control and other means of sound stoppage be sought.

12. Toilet Room Walls

Where a toilet room opens to a fire-rated corridor, the door **shall** have a positive latching action except that a push-pull operation is permitted or the door may be omitted altogether (see Section 3.13, Item 6), provided the fire rating of the corridor walls extends around the perimeter walls of the toilet room also.

Walls of all student and public "gang" toilet areas are recommended to be of masonry.

13. Toilet Room Ceilings

Ceilings in student and public "gang" toilets are recommended to be of cement plaster or in elementary schools, moisture-resistant gypsum wallboard ceilings should be satisfactory. Lay-in acoustical ceilings are not recommended in these areas, but if used, then the perimeter walls and the walls between male and female areas should extend to the underside of floors or roof decks and be properly sealed to afford sound-stoppage and security.

14. Unventilated Attic Areas

The architect and mechanical engineer should carefully analyze situations where unventilated attic areas may be formed by extension of partitions or fire walls to roof decks so that condensation problems do not occur.

15. Finishes

a. The architect **shall** select finishes that meet or exceed the following minimum surface reflectances (all foot-candle lighting recommendations under DIVISION 12—ELECTRICAL are based on this criteria).,

Ceiling cavity*	80 percent
Walls	50 percent
Floor cavity*	20 percent

*ELECTRICAL ENGINEERS COMMONLY DEFINE "CEILING CAVITY" AS ANY FINISH AREA ABOVE THE BOTTOM SURFACE OF THE LIGHT FIXTURES, AND "FLOOR CAVITY" AS THE AREA BELOW DESK-TOP LEVEL (30" ASSUMED).

b. Where paint is specified, consider the use of "eggshell" or semi-gloss finish for easier maintenance, rather than flat paint.

c. In high use areas where serviceability and cleanliness are paramount, such as toilet areas and kitchens, consult DHEC regulations for acceptable finishes.

16. **Roof Slope**

Unless otherwise waived in exceptional circumstances by OSP&B, all roof areas **shall** have a minimum slope of 1/4" per foot. This **shall** include roofs with built-up membrane systems as well as single-ply elastomeric membrane systems. Also see Section 7.06, Item 3.

17. **Building Code Analysis**

Building Code compliance is the ultimate responsibility of the architect and his associated engineers as agents of the district, and an outline Code analysis **shall** be incorporated into the final drawings, preferably on the cover sheet or one of the floor plan sheets. See DIVISION 13—SAMPLE FORMS for suggested forms to use, or architect may revise to suit individual job. Submitted data **shall** set forth all pertinent Code requirements, including the following.

a. Date of Standard Building Code and amendments thereto in effect at time of submittal of design development drawings (Example: 1979 Standard Building Code, 1981 Amendments). The issue of the Code in effect at that time will establish permanent Code requirements for the project, including the construction phase.

b. Construction classification (Example: Type IV—1-hour Protected, etc.). List the fire protective requirements for such construction as listed in Table 600 of the Standard Building Code.

c. Occupancy classification of the various parts (Example: Educational, Large Assembly, etc.).

d. Where area limitations occur due to construction classification, indicate fire wall separations on drawings. If there have been area changes since design development drawings, resubmit area calculations; if no area changes have been made, resubmittal is not necessary.

e. Delineate all fire walls or fire-rated walls by distinctive "pocheting" or other linear markings to clearly indicate their locations. This delineation shall be done on all floor plans of the architectural, structural, plumbing, mechanical, and electrical drawings.

f. In addition to information normally contained in the door schedule, indicate location of all fire-rated doors, and those doors with special hardware as noted below, directly on floor plans by means of figures and letters as follows.

3	=	3-hour		A-label fire door
1½	=	1½-hour	B- or	D-label fire door
1	=	1-hour		B-label fire door
¾	=	¾-hour	C- or	E-label fire door
20	=	20-minutes		

P = Panic hardware device
S = Smoke hold-back device

g. When the type of construction selected requires fire walls, fire-rated walls, or fire-rated assemblies, specific reference is made to the SBC, Chapter X, "Fire Resistance Standards for Materials and Construction."

Resistance ratings **shall** be based on specific assemblies that have successfully performed under tests made by an approved laboratory (such as U.L., Factory Mutual, Warnock Hersey, etc.), except that if the architect finds that the design requires materials or construction other than that shown in a specific assembly, reference is made to the SBC, Section 103, subsection entitled "Alternate Materials and Alternate Methods of Construction." Under this option the burden of proof of the fire rating rests with the architect.

It is recommended that assemblies be chosen or alternate methods proposed and so indicated at the design development stage or, at option of architect, this may be delayed until the construction document stage. If the latter, it is recommended and urgent that the architect seek concurrence of OSP&B before completion of working drawings.

h. In the case of an addition to an existing building, 4-hour wall separation **shall** normally be provided between new and existing unless the architect has reliable information indicating that this would not be required from a code standpoint.

18. **Glazing Requirements**: The latest state and federal regulations, as well as Standard Building Code requirements, **shall** be complied with.

19. **Mounting of Exit/Directional Signs**

All exit signs and directional signs related thereto should be wall-mounted (whether on surface or recessed) wherever possible, as ceiling-mounted signs are especially vulnerable to vandalism in schools. The architect should take this into consideration in his design and avoid glass areas over doors or glass wall areas where such signs would usually be located.

20. **Accessibility for the Physically Handicapped**: See DIVISION 4—BARRIER-FREE DESIGN.

7.05 SPECIFICATIONS—SPECIAL CONDITIONS

1. See DIVISION 3—DESIGN CRITERIA for any requirements that affect specifications. Note in Section 3.24, Item 2, the recommendation that general student lockers be the acoustic-type and that at least an "alternate" price be taken to include this.

2. **Record ("As Built") Drawings**

The architect **shall** specify that record drawings must be furnished to the district at the completion of the work. Refer to Section 9.09 for complete requirements that should be included in the specifications.

3. **Naming of Subcontractors**

a. The architect **shall** specify that the proposed subcontractors for roofing, mechanical, plumbing, and electrical work be named in the bid form and that no other subcontractors for these trades can be used without the express consent of the district. It is optional with the architect if he wishes to have additional subcontractors for other trades identified.

If "alternate" prices are included in the bid and if the possible acceptance by the district of any alternate price would then cause a general contract bidder to wish to use a different subcontractor from the one he has first named in the bid form, then he **shall** so note this in his bid or otherwise he will be bound to the originally named subcontractor.

b. The architect **shall** also specify that in case of bid "overrun," where it is necessary to negotiate a price reduction in the project, that the contractor must first confine his negotiations with the subcontractors named in the bid form. In case of failure to satisfactorily conclude such negotiations, the contractor **shall** then submit to the architect, for approval, the names of a minimum of two additional bidders for each trade with whom he wishes to negotiate.

4. Bonds

a. Bid Bond: The architect **shall** specify that a bid bond accompany all bids in the amount of 5 percent of the bid price. Certified check or cashier's check is acceptable in lieu of bid bond.

b. Performance and Labor/Material Payment Bonds: These **shall** be required to 100 percent of the contract amount (to embrace all trades under the general contract) and **shall** be on the standard AIA forms, latest edition. Multiple bonds of smaller amounts totaling 100 percent **shall not** be allowed on any single contract.

5. Contractor's Insurance

a. The architect **shall** specify that all required statutory insurance be included, such as workmen's compensation and employer's liability.

b. It is recommended that the limits of vehicular and general liability (both bodily and personal injury and property damage) and provisions for any special coverages be determined by the district and/or its authorized agent. AIA Form G610 is suggested for this purpose.

c. The architect **shall** require that complete certificates of insurance indicating mandated coverages be furnished the district on standard AIA G705 or "ACCORD" forms, latest edition.

6. Property Insurance

a. State law requires that insurance coverage on public schools be placed with the State Insurance Reserve Fund. There are apparently conflicts between the requirements of that body and AIA General Conditions used by most architects. For instance, the Property Insurance heading in the August 1976 edition of the General Conditions A201, under 11.3.1, makes the **owner** responsible for carrying "all-risk" insurance, which includes theft coverage and also apparently does not allow for any "deductible."

b. Property insurance for schools written through the State Insurance Reserve Fund insures **only** against fire, extended coverage, vandalism, and malicious mischief. Any insured loss carries a $100.00 deductible for most districts, although there are exceptions to this and the individual district should be consulted.

c. Therefore, A201, August 1976, if used, should be amended to account for the preceding and any other discrepancies.

- Specify that property insurance on the entire project to cover fire, extended coverage, vandalism, and malicious mischief to the full insurable value thereof shall be carried by the district through the Insurance Reserve Fund and a certificate of compliance shall be furnished to the general contractor through the architect.

- Specify that this insurance shall have a $100.00 (or other amount applicable to the particular school district) "deductible" on any insured loss and that the amount of this deductible and **any** other losses not specifically covered under the district's policy shall be borne by the general contractor and/or his subcontractors. Specify that the insurance does not cover any loss from theft or burglary, nor does it cover loss of any tools, equipment, scaffolding, staging, towers, forms, machinery, etc. owned or rented by mechanics, or the contractor or subcontractors, which are not intended to become a part of the project; but does cover damage to the building or contents because of theft or burglary.

- Specify that the general contractor and/or his subcontractors must report any loss to the district (who in turn will notify the State Insurance Reserve Fund--Telephone

803-758-3543) as soon as the loss occurs in order that damage be assessed before job conditions are disturbed. Formal claims against this policy should be submitted within 21 days after occurrence.

d. In cases of sitework (grading, paving, etc.) and renovation and/or alteration projects, property insurance coverage is not necessarily mandated by the State Insurance Reserve Fund, and the architect should consult the district and/or its authorized agent as to desired and prudent coverage that should be obtained.

e. Further information can be obtained from the Insurance Reserve Funds, 1122 Lady Street, Suite 600, Columbia, South Carolina 29201.

7. **Time of Completion**

a. Specifications **shall** state the number of calendar days for completion of the project from date of contract or from date of issuance of "Notice to Proceed," at the architect's option.

b. It **shall not** be permissible to require or permit any bidder to state individually the number of days in which he would agree to complete the job since in essence this would be construed as bidding on "time" as well as cost.

8. **Liquidated Damages**: It is recommended that the specifications stipulate liquidated damages for failure to complete job within specified time limits. It is also recommended that the district be responsible for setting the per diem damage amount.

9. **Underground Utilities Damage Prevention Act**: Reference **shall** be made in the specifications to the so-called "Underground Utilities Damage Prevention Act," Statute 58-35-10, with the stipulation that the contractor and/or any applicable subcontractors shall be bound by the requirements of this law.

10. **OSHA Standards**: Reference **shall** be made in the specifications to South Carolina OSHA Construction Standards which shall be applicable to all construction operations.

11. **Federal Funds**

If a project is funded or partially funded with federal money:

a. The provisions of the Davis-Bacon Act will normally prevail and the required minimum wage rate schedule **shall** be incorporated into the specifications. If the architect has been unable to obtain the wage schedule by the time he is otherwise ready to issue the contract documents to bidders, he may issue the wage schedule later as an addendum, but this **shall** be done so that the postmark on the mailing to bidders of such addendum is at least fifteen (15) days prior to date of bid.

b. The architect's attention is called to the requirements of the Equal Employment Opportunity Commission and also to the Office of Federal Contract Compliance Procedure and its published regulations concerning Minority Business Enterprise and Women's Business Enterprise.

12. **Non-Residents Withholding Tax**

The following **shall** be included in the specifications.

a. The contractor's attention is directed to Section 12-9-310 of the South Carolina Income Tax Code dealing with "Withholding Agents and Withholdings," a portion of which is stated below to acquaint bidders with these requirements.

> Anyone hiring or contracting or having a contract with a nonresident taxpayer conducting a business of a temporary nature carried on within the state where such contract exceeds $10,000.00 or could be expected to exceed this amount, must withhold two percent (2%) of each and every payment made to the non-

residents. This provision pertains to corporations, partnerships, estates, trusts, etc., as well as individuals.

This provision may be waived only if the non-resident makes application to the South Carolina Tax Commission for relief and posts a bond with the Tax Commission for 2% of the contract price to insure his compliance with all applicable provisions of the South Carolina Income Tax Act. This bond must be secured by cash, which shall bear no interest, securities approved by the State Treasurer, or by any insurance company licensed by the South Carolina Insurance Commission. The withholding agent must withhold on each payment until he receives official notice from the Tax Commission waiving this requirement.

b. Further information may be obtained from the South Carolina Tax Commission, Income Tax Division, P. O. Box 125, Columbia, South Carolina 29214.

13. **Bidders' and Contractors' Licenses**

Reference is made to "An Act To Regulate the Practice of General and Mechanical Contracting in South Carolina," along with accompanying rules and bylaws as published by the South Carolina Licensing Board for Contractors, Columbia, South Carolina. The following are capsule generalizations from these requirements as of this date (1982).

a. Bidders' License: Required for a general contractor (bidding as the prime contractor) if his bid is $30,000 or more. Required for a mechanical contractor (bidding as the prime) if his bid is $17,500 or more; not required of the mechanical contractor if he is bidding as a subcontractor to a licensed prime contractor.

b. Contractors' Licenses

- There are two types of licenses, each with several major subclassifications.

General Contractor:*

Highway
Building
Public Utilities
Specialty

Mechanical Contractor:*

Plumbing
Heating
Air Conditioning
Electrical
Lightning Protection

*IT IS POSSIBLE FOR ONE CONTRACTOR TO HAVE AN UNCLASSIFIED LICENSE TO DO WORK IN ALL SUBCLASSIFICATIONS IF HE IS SO QUALIFIED.

- All of the general contractor classifications above have four different cost-of-work licensing limitations, and all of the mechanical contractor classifications have three different cost-of-work licensing limitations.

- The general contractor's license is required when the cost of the work is $30,000 or more.

- The mechanical contractor's license is required when the cost of the work is $17,500 or more; unlike the regulations for a bidder's license, the mechanical contractor's license is required whether the mechanical contractor is the prime contractor or a sub-bidder to a prime contractor.

- In cases where a job is predominantly in the mechanical realm, a general contractor can still act as the prime contractor regardless of the dollar volume of his work compared to that of his mechanical subcontractor, but in a reverse situation, a mechanical contractor can only contract as the prime if more than 50 percent of the dollar volume is his own work.

c. The architect **shall** require that prime bidders indicate their bidder's and contractor's license numbers on the bid form. It is also recommended that this information be placed on the outside of the sealed envelope containing the bid form, but failure to do so **shall not** be grounds to disqualify the bidder.

If the bidder has failed to put the above information on the outside of his envelope, then it is permissible for the architect to open the bid, but he should then first ascertain that the required information is on the bid form itself, in which case he may proceed to read the bid publicly; however, if the information is not on the bid form, then the architect should reject the bid and return it to the bidder without reading it publicly.

d. The architect's attention is called to Section 29 (p. 22) of the published rules and bylaws previously mentioned.

> It shall be the duty of engineers, architects, firms, corporations and others receiving bids from General or Mechanical Contractors, as construed under the Act for Licensing Contractors in South Carolina, to report to the Secretary of the Board all work coming under their jurisdiction. The notification shall include the time and place for receiving bids, the estimated cost and nature of the work together with a list of prospective bidders. Such notices shall be filed in time to reach the Board at least twenty-four hours in advance of the date of receiving bids. Immediately after the contract is awarded, the Board shall be notified giving name of contractor and the amount of the contract.

e. Further information can be obtained from the South Carolina Licensing Board for Contractors, P. O. Box 5737, Columbia, South Carolina 29250.

14. Posting of Occupant Capacity

a. A permanent sign stating the maximum occupant content based on the capacity of the exits **shall** be conspicuously posted in all gymnasiums, auditoriums, cafeterias, theatres, or other like places of assembly within a school. Each sign shall read "Occupancy by more than   persons is dangerous and unlawful."

b. Such signs **shall** be of metal or plastic, installed with nonremovable fasteners, and **shall** have lettering a minimum of 1" high. Signs **shall** be installed at a minimum of 8' high.

15. Extra Finish Materials

It is recommended that specifications require that extra finish materials be furnished by the contractor to the district at the completion of the project for purposes of future replacement and maintenance. Examples: floor and ceiling tile, carpeting, ceramic tile, or other materials where color matching or availability of small quantities might be a future problem. The architect should consult with the district as to type of materials and desired quantities to be included.

16. Or Approved Equal Clause

a. An "or approved equal" clause **shall** be included to apply to all sections of the specifications, the intention being to provide "open" specifications throughout. If an architect desires to restrict any material or product to just one manufacturer, he **shall** first request permission in writing from OSP&B before submission of final construction documents and include substantiating justification.

b. Upon written notification to OSP&B, a modification of the procedure outlined in Paragraph a may be made in a case where a district has a legitimate preference or need for a particular manufacturer's product or equipment.* In such an instance, it is recommended that the architect name the desired product or equipment as the base specification and then include an "alternate" bid listing a competitive but equal item, with the bidders also free to seek approval of equivalent items to that named in the alternate. Competition will thereby be maintained and the district will be given the opportunity to make a final choice, weighing preference against money difference.

c. When requests for approval of "equals" are made during the bid period and such approvals are granted, it is recommended that all general contract bidders be so notified in ample time for them to disseminate the information to interested sub-bidders.

---

* THIS MAY OCCUR WHERE ADDITIONS ARE MADE TO BUILDINGS AND IT IS DESIRED TO MATCH EXISTING ITEMS, OR IN CASES WHERE A DISTRICT MAY WISH TO STANDARDIZE ON SIMILAR ITEMS OF EQUIPMENT THROUGHOUT THE DISTRICT FOR REASONS OF SERVICE, ETC.

7.06 MEMBRANE ROOF SYSTEMS

1. General

a. This short treatise deals with the basic considerations of membrane roof systems related to building design rather than with detailed technical roofing and insulation specifications.

b. For full information on roofing and insulation specifications and details, the architect is referred to *The NRCA Roofing and Waterproofing Manual* (from the National Roofing Contractors' Association, 8600 Bryn Mawr Avenue, Chicago, Illinois 60631). This publication is updated annually and represents the latest expertise available on roofing.

c. Briefly, the traditional "built-up" roof systems are mainly waterproofed by either hot asphalt or coal-tar pitch in combination with plied felts; the asphalt system is damaged over a long period by standing water, while the coal-tar pitch is more impervious to water but is usually more costly and more disagreeable to install due to unpleasant fumes. Over the last several years, new single-ply elastomeric roof membranes of rubber and various plastics have come into prominence but at this time they have not been in use long enough to compare them with the traditional built-up systems as to durability and maintenance.

2. Pre-Roofing Conference

a. The architect **shall** specify that a pre-roofing conference be held at the job site **after** the roof deck is installed and **before** roofing operations have begun, and that the architect, roofing consultant (if used), roofing manufacturer's representative, general contractor, roofing contractor, and deck applicator all be present.

b. The deck applicator should be required to state in writing that the deck has been installed in accord with manufacturer's recommendations and industry standards.

c. The roofing contractor should be required to state in writing that he has inspected and accepts the deck surface upon which to do his work, or otherwise notify the architect of any deficiencies.

3. **Roof Slope**

a. Refer to Section 7.04, Item 16. Although it is generally claimed that standing water does not damage coal-tar pitch roofs nor most of the single-ply elastomeric roof membranes, it is nevertheless wise to rid all roofs of any standing water. Therefore, all portions of all roofs (except as noted under Paragraph b herein) **shall** have a minimum slope of 1/4" per foot, regardless of the type of roofing (when slopes are less than this, deflection of the structure may tend to negate good drainage).

b. Where a series of perimeter drains occur around the periphery of a roof and a level valley is formed (such as at a parapet wall), it is recommended that crickets with at least a 1/8" in 12" slope be installed to channel the water to the drains. If this is not feasible, the architect should specify that drains should be installed at 30' to 35' apart maximum and that the valley be checked for level to the extent that no water is left standing after 36 hours in hot weather or 72 hours in cold weather.

4. **Roof Drains**

a. Drains should be sized and located as per accepted criteria, except in cases of level valleys they should be spaced as indicated in Item 3, Paragraph b preceding to aid in positive drainage.

b. It is imperative that all drains be set at the proper level and low enough to prohibit a build-up of roofing plys that could form a dam around the drain itself, thereby creating a ponding situation. Prefabricated sumps may be considered.

5. **Overflow Provisions**

a. Where parapet walls or high gravel stops occur, scuppers **shall** be provided as approved by OSP&B for relief of water buildup in case of drain stoppage. A 4" buildup of water above the drain level **shall** be the maximum permitted.

b. Where water flow is to drains at "interior" locations and it is not possible to install scuppers, a system of reliever overflow piping **shall** be provided that is independent of the normal roof drain lines. This system **shall** activate upon a buildup of no more than 4" of water above the drain level. It is recommended that the system of overflow piping terminate through an exterior wall so that upon activation, overflow water would be readily visible from the ground.

6. **Parapets and Through-wall Flashing**

a. Although parapet wall installations will perform satisfactorily if properly constructed and flashed, they again can quite often be the source of leaks. If a building design is dependent on a parapet wall, the detail should be carefully studied.

b. All parapet wall copings or caps should have a minimum slope to the back side of 1¼" in 12" and if a metal cap is used, a slope is even more imperative so that water does not pocket at the joints in the metal (these joints should be thoroughly sealed in any case).

c. All through-wall flashing for parapet walls or for other locations, such as a lower roof abutting a higher wall, etc., should be of a flexible high-strength material that has all joints properly lapped and thoroughly sealed.

7. **Built-in Metal Gutters**: Avoid use of this type of gutter installation—serious problems that are difficult to rectify are the usual result.

8. **Roof Expansion Joints**

a. Location and design of expansion joints is a critical factor for any membrane roof and there are several "rules of thumb" in common acceptance, two of the most important of these being to install a joint wherever the roof framing or deck changes direction and wherever a building expansion joint occurs.

- b. Care should be taken in the design of the building so that expansion joints are located such that the normal flow of water to drains is not interrupted.

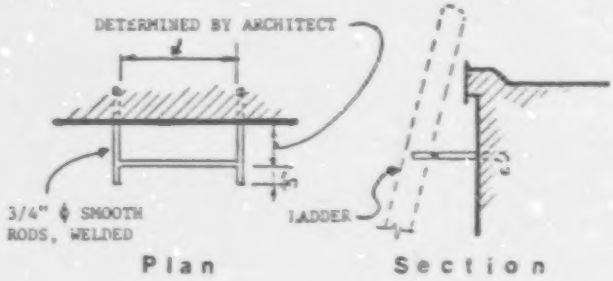
9. **Roof Scuttles and Ladders**

a. All roof areas of buildings with membrane roofs **shall** be accessible from within the building interior by means of a roof scuttle served by an attached wall ladder, unless otherwise waived by the OSP&B. Ladder handrails **shall** extend up into the scuttle opening to within 3" of the top of the scuttle cover.

b. Where different roof levels occur, all levels **shall** be accessible and where differences in height make it necessary, exterior wall-mounted ladders with the handrails extending above the line of the higher roof should be used.

c. Consult OSHA General Industry Standards, Subpart D, for scuttle and ladder requirements in detail. Note that any ladder over 20' in height requires a ladder cage.

d. In the case of a small addition to an existing building (where no roof scuttle is installed) and there is no logical place to include a new scuttle, OSP&B may permit the installation of an exterior wall-mounted ladder brace as a means of roof access. Detail follows.



LADDER BRACE

10. **Rooftop Mechanical Equipment**

a. It is desirable from a roofing standpoint to have as little rooftop equipment installed as possible.

b. Where rooftop mechanical equipment is necessary, it should be installed preferably on a perimeter curb with built-up flashing and counter-flashing. Where this is not feasible and the equipment is supported above the roof by a superstructure, the supporting structure should be high enough off the roof to allow for future reroofing operations beneath with minimum clearances as follows (NRCA Manual).

Width of Equipment	Up to 2'	2' to 3'	3' to 4'	4' to 5'	5' and more
Clearance Above Roof	14"	18"	24"	30"	48"

c. Where rooftop equipment is mounted on perimeter curbs, care should be taken to obtain a waterproof installation at the metal counter-flashing at the bottom of the equipment, and care should also be taken that leakage does not occur directly through the equipment itself (these two sources are often the cause of leaks).

11. **Walk-pads**

a. Walk-pads are recommended to be placed around all sides of rooftop equipment subject to periodic maintenance and also around three sides of the roof scuttle. Installation of pad walkways from scuttle to equipment locations may be questionable due to cost, and should be considered on an individual job basis as to length of travel, etc.

b. Minimum pad thickness of 3/4" is recommended, and it is extremely important that pads be bonded in strict accordance with individual roof manufacturer's directions, whether directly to membrane or on top of gravel.

12. **Sheet Metal Work**

a. "Raw" galvanized iron should not be used in conjunction with membrane roofs, such as for gravel stops, flashing or counter-flashing, guttering, etc., due to rust possibility and difficulty of paint adhesion. Factory prefinished/painted or "paint-grip" galvanized iron is usually satisfactory, although aluminum, copper, or stainless steel of proper weights are the preferred metals.

b. Sheet metal downspouts should **never** be used at grade level locations due to abuse by students. Rather, use plastic pipe, or steel pipe or tube at least up to 8' high.

13. **ETV Antenna**

a. It will be prudent to provide for an antenna installation in any new school even if ETV is not to be used in the immediate future.

b. In some cases an installation can be made satisfactorily alongside a higher wall, such as a gymnasium wall rising above an adjoining lower roof. In probably the majority of cases, however, the antenna will more than likely come off the main roof surface and a suggested detail for this type of installation is shown in DIVISION 15—REFERENCE MATERIAL.

14. **Roof Guarantee/Bond**

a. It is recommended that both the general contractor and the roofing contractor be bound by a two-year guarantee on all roofing and sheet metal work.

b. Manufacturer's guarantees or bonds are a controversial subject with most architects and owners. The content, coverage, and cost of guarantees/bonds vary widely and there is no particular uniformity among manufacturers. It is recommended, however, that only a guarantee/bond covering **workmanship** as well as materials be employed, with enough monetary coverage to be worthwhile. Length of coverage ranges from five years to as long as 20 years with varying stipulations and conditions.

c. In considering a guarantee/bond, caution should be exercised that its provisions do not nullify the protection available under the Federal UCC (Uniform Commercial Code) which has been adopted by South Carolina.

15. **Inspection—Quality Control**

a. Since the roof is of such paramount importance, a district may wish to engage a roof consultant for full-time inspection services during the course of the roofing operations.

b. Since the cost of the better roof bond/guarantee can range up to as much as 6-8 percent of the cost of a new roof, some owners opt to trade this expense off to pay for full-time inspection services during application.

16. **Roof Maintenance**

a. The district is urged to establish a program of regular roof maintenance for all schools, new or old. A properly executed maintenance program can add years to the life of many roofs by detecting minor problems before they escalate into major ones.

b. A complete roof inspection should be made twice a year (spring and fall) by competent district personnel, or the district may be wise to contract with a roofing consultant or a reputable roofing contractor for this service.

c. If roof repairs are to be attempted by district personnel, it is urged that they be done under the general direction of a roof consultant or a reputable and well-qualified roofing contractor.

When making repairs to the traditional built-up roofs, for instance, the first consideration is to determine if it is an asphalt or coal-tar pitch roof, as the methods and materials for repairing vary distinctly between the two. An experienced roofing person can usually tell the difference between the two materials by odor, or an even more reliable method is to drop a small sample in varsol—asphalt will dissolve while coal-tar pitch will not.

d. Caution should be exercised before making any repairs to a roof covered by a guarantee/bond without first notifying the roofing manufacturer's representative, or the guarantee/bond may be voided.

17. **Reroofing Projects**

a. With the great numbers of school buildings constructed in South Carolina since the 1950's, there will be a continual need for the reroofing of existing buildings on into the future.

b. It is recommended that the services of a roof consultant be retained to first analyze the feasibility of repairs versus the need to reroof. If reroofing is in order, then it is further recommended that the roof consultant be used to provide drawings, specifications, and inspection services for this. Note from Section 1.06, Item 5, that the services of a roof consultant and/or architect are mandated for reroofing projects if state money is involved.

c. If roof problems seem to dictate action of some sort, the first consideration should be to determine if the roof is feasibly repairable.

> Will the cost of repairs exceed 25 percent of the cost of an entire new roof? Can a minimum of five years of additional roof life be expected after the repairs?

d. In this day of the need for energy conservation, the scales sometimes tip in borderline cases to a decision to reroof in order to install additional roof insulation. However, an investigation should first be made to determine if it is feasible to add blanket or batt insulation in the attic area from below without compromising building code fire-rating requirements.

e. If all considerations point to reroofing, however, then it is normally desirable to add roof insulation, particularly in older buildings, although the presence of any existing attic ventilation should be addressed. The use of "tapered" insulation gives the advantage of obtaining a slope to the usual dead-level surface, and this is extremely desirable (3/16" slope is acceptable in reroofing). Tapered insulation is somewhat costly, however, and if the dead-level roof must be retained, then consideration may be given to the use of a system supposedly not damaged by standing water, namely coal-tar pitch built-up or one of the newer elastomeric membranes.

It may be wise to specify a pre-bid conference with all potential bidders, as there are times when valuable suggestions and/or observations may be offered by bidders in time to be incorporated into the bid documents.

Consideration may also be given to the taking of "alternate" bids on one or more optional roofing and insulation systems in order to select the most appropriate to fit budget limitations.

f. It is most important that when a replacement roof system is designed, a structural engineer be consulted before any additional weight is added to the existing structure.

7.07 FINISH HARDWARE

1. **General**

   a. Also see Section 3.22 of this guide. Note especially recommendations concerning metal and mineral-core wood fire doors, use of fixed and removable mullions for exterior and interior doors, and prohibition of hanging doors back-to-back on the same mullion.

   b. Also see SBC Section 1117, and NFPA 101, Section 5.2, for Code requirements.

   c. Only "heavy-duty" hardware should be specified except that "standard" grade may be suitable in areas not predominately used by students, such as for interior office suites, etc.

   d. The architect should retain a member of the Society of Architectural Hardware Consultants to prepare the hardware specifications, and the specifications should also require that the hardware contract supplier have a member of the above organization on his staff.

2. **Door Panic Devices** (See SBC Section 1115, subsection "Panic Hardware")

   a. Exterior Locations

   - "Touch-bar" type exit devices **shall** be installed on all exterior doors requiring panic hardware (this type pushes in rather than down, and is considered to be more secure against unauthorized entry and more maintenance-free). It **shall** be of a design that does not facilitate the use of a chain and padlock.
   - All exposed surfaces **shall** be nonferrous metals or stainless steel.
   - It is recommended that no exterior thumb pieces be used so that panic devices must be "dogged" in and the doors then operated with push/pull action.

   b. Interior Locations

   - "Touch-bar" type exit devices are also recommended for interior doors where panic hardware is required, provided fire label requirements can be met; exposed surfaces **shall** be same materials as for exterior door devices above.

3. **Lock and Latch Sets**

   a. All doors, unless otherwise excepted by OSP&B, **shall** be equipped with hardware that is operable at all times from the egress side by a single operation (i.e., use of keys, thumb turn bolts, and the like **shall** be prohibited).

   b. All doors opening to fire-rated corridors **shall** have a positive latching action, except that doors to any toilet room serving more than one occupant at a time may have push/pull operation, provided the fire-rated corridor wall extends around the toilet room. (Also see Section 7.04, Item 12.)

   c. Individual student toilet rooms (such as in kindergartens and elementary classrooms) **shall** have privacy locks which shall release upon turn of knob from inside and also **shall** be equipped with emergency release feature on outside.

   d. Where double doors open to fire-rated corridors from mechanical, electrical, or storage rooms, or other unoccupied areas, head and foot bolts may be used on the inactive door, without a closer.

4. **Closers**

a. Floor Closers

- It is recommended that floor closers be used for high-traffic and high-abuse door locations, particularly for all exterior doors from corridors or lobbies.

- The cost of a floor closer is usually somewhat more than the cost of most surface-applied overhead closers and hinges. However, a floor closer properly installed is usually much more maintenance-free and will last a great deal longer than an overhead closer. Also, overhead closers are more subject to vandalism.

- It is paramount, however, that floor closers be installed correctly, and the architect should mandate that the manufacturer's "locating jig" be used when the closer is installed.

- A floor closer should be specified with a built-in stop in the closer itself along with a coordinated stop at the top, both set for a minimum opening of 95°, with 105° preferred, to lessen the pressure on the stops. Surface-applied floor or wall stops are not deemed necessary if closers with built-in stops are specified.

- The type of floor closer is also recommended that permits the door to stay in place if the closer is removed for service.

b. Overhead Closers

- Parallel-arm type overhead surface closers are recommended; concealed or track-arm type closers are **not** recommended. Floor or wall stops should be furnished for all exterior doors using overhead closers. All kitchen toilets and other toilet areas serving more than one person at a time **shall** have a closer on the door.

c. Closers for Fire Doors

- All fire doors **shall** be self-closing unless otherwise excepted by Code requirements.

- In addition, fire doors in areas subject to high-use traffic during the school day, including stairwells, horizontal exit doors (usually corridor-to-corridor situations), and any corridor smoke doors, **shall** be capable of being held open by magnetic devices which release upon detection of smoke. Ceiling-mounted smoke detectors in combination with wall-mounted magnetic releases should be specified rather than the combination closer/detector at the head of the door because of vandalism factors (particularly in all secondary schools).

d. Doors to Exit Access Corridors

Note from Section 3.22 that doors opening to or from exit access corridors are required to have a 20-minute rating. Solid core wood-staved type doors are recommended for this use.

The 1982 SBC does not require classroom-to-corridor doors to have self-closing action but all other doors opening to or from exit access corridors **shall** be self-closing. Spring-loaded hinges will be considered as meeting Code requirements in this regard; number of spring hinges per door leaf should be as per manufacturer's directions, and generally relates to door weight (quite often one spring hinge is sufficient).

5. **Hinges**

a. Minimum installation should be 4½" x 4½" x 1½" pair per leaf.

b. Plated steel hinges with finish to match hardware are generally recommended for all locations, except that in coastal areas solid brass, bronze, or stainless steel hinges may be considered for exterior doors. Prime-coated hinges are not recommended for any location.

c. Ball-bearing hinges should be specified for all doors with overhead closers or spring-loaded hinges.

d. Out-swinging exterior or other security doors should have hinges with security studs or nonremovable pins.

7.08 CARPET

1. General

a. Carpet is recommended for offices and administrative areas, classrooms, auditoriums, music facilities, media centers, and the like. While carpet has been used satisfactorily in corridors and cafeterias, more care and service may be required in areas of this sort. Carpet is generally **not** recommended for stairways, health units, science labs, art rooms, home economics kitchen areas, and most types of vocational facilities. Carpet **shall** not be used in any toilet areas.

Possible use of carpet in gymnasiums and locker rooms is not included in this limited treatise.

b. Practically all carpet now recommended for school use is made with either "third or fourth generation" nylon-face yarn. Only low-pile, high-density carpet should be specified.

c. Olefin yarns have excellent soil resistance but are not as long-wearing as nylon and are a very minor factor in the overall market.

The use of acrylic yarns has largely been discontinued as they are not as long-wearing or as soil-resistant as nylon.

d. Direct-glue-down installation is recommended over concrete (carpet over pad is more expensive and although acoustic qualities are better, it is difficult to stretch and keep tight in large areas, and the rolling of equipment across carpet may also cause wrinkles). In using the glue-down method, however, it is extremely important that the carpet manufacturer's installation instructions be closely followed, particularly as to the type of adhesive used.

In renovation work where wood floors may occur, it is recommended that a carpet consultant be used to determine the feasibility of using the glue-down method vs. pad installation.

e. If properly maintained, quality carpet will last for many years. Frequent vacuuming and quick removal of soil spots are the two main essentials for a long-life carpet.

f. It is recommended that a carpet consultant be used when specifying carpeting.

2. General Types of Nylon Carpet

a. Tufted carpet: Manufactured with "third or fourth generation" nylon-face yarn with build-in static control. Previous problems with unraveling of tufted carpet have been largely overcome, particularly in carpet that is back-coated with 20-lb. "Tuft Bind" or better, and tufted carpet when used in appropriate locations should make a very satisfactory installation.

b. Woven carpet (woven-through-back): Manufactured at this time (1982) mainly in "third generation" nylon-face yarn with build-in static control. Woven is still considered to be the superior carpet construction but is premium-priced (see table hereafter).

c. Flammability Test

- Refer to the Standard Building Code, Section 704, subsection "Floor Covering," for flammability requirements. The Flooring Radiant Panel Test, NFPA 253, is generally considered to be more meaningful as a flammability gauge than the so-called "tunnel test."

d. Specific Types of Carpet Recommended for School Use

The following nylon carpets are considered to be an appropriate list from which to select a carpet of good quality for school use, with "A" being the least expensive and "E" being the best quality and most expensive. Carpets of these exact specifications are made by a number of leading manufacturers. Consult manufacturers' literature and a carpet consultant for more detailed specifications.

Designation	Type Carpet	Yarn Weight Per Sq. Yd.	Total Weight Per Sq. Yd.	Tuft-Bind (Pull Resistance)	Backing	Relative Installed Costs*	Remarks
A	Tufted	22 oz.	62 oz.	12 lbs.	Jute or Poly	100*	See Note 1
B	Tufted	26 oz.	65 oz.	12 lbs.	Jute or Poly	105	See Note 1
C	Tufted	28 oz.	66 oz.	20 lbs.	Back Coating (loc-back)	110	See Note 2
D	Woven	21 oz.	52 oz.	N/A	(Woven-through-back)	125	
E	Woven	34.5 oz.	69 oz.	N/A	(Woven-through-back)	140	

* THE FIGURE OF 100 IS ONLY A BASE FIGURE WITH WHICH TO COMPARE THE APPROXIMATE COST OF THE REMAINING CARPET, PERCENTAGE-WISE. FOR INSTANCE, CARPET "E" WILL COST APPROXIMATELY 40 PERCENT MORE THAN CARPET "A."

NOTE 1: THESE CARPETS ARE RECOMMENDED FOR LIGHTER TRAFFIC AREAS SUCH AS KINDERGARTENS, CLASSROOMS, AND OFFICES.

NOTE 2: THIS CARPET IS SUPERIOR TO "A" AND "B" DUE TO THE BACK-COATING WHICH NOT ONLY INCREASES PULL-RESISTANCE, BUT ALSO IS MORE SATISFACTORY FOR CUTOUT REPLACEMENTS WHERE REPAIRS ARE NECESSARY.

3. Certification

a. The architect **shall** specify that the carpet manufacturer shall identify each roll of carpet by individual number, using a hangtag or similar device, and that the manufacturer shall furthermore furnish written certification that those particular rolls were shipped to the carpet contractor for that particular job; the manufacturer shall also attach to his certification, copies of the testing laboratory reports as to flame spread, smoke developed, and radiant flux for the type of carpet specified.

b. The architect **shall** also specify that a sample of each type of carpet used shall be delivered to him along with the identification numbers, and manufacturer's certification and laboratory tests as called for in Paragraph a. These samples and related data **shall** be made available to the OSP&B and the applicable fire authorities at the time of the occupancy inspection.

4. **At Completion**

It is recommended that the architect include the following requirements in the specifications.

a. That all carpet remnants and scraps be given to the district at the completion of the job.

b. That all applicable maintenance manuals be given to the district, and that the carpet contractor personally instruct district maintenance personnel in the proper care and maintenance of the carpet.

7.09 FOLDING GYMNASIUM SEATING

1. The Standard Building Code does not have specific criteria for folding gym seating. Therefore, all folding seating installations **shall** be in accordance with the applicable portions of NFPA 102 except where they are at variance with any mandates herein.

2. At this time (1982), there are mainly three nationally known manufacturers of folding seating; these manufacturers are denoted as "A," "B," and "C" hereafter. The state representatives of these manufacturers were all consulted in the preparation of this section.

3. **Row Spacing**

a. 22" and 24" is standard for the three manufacturers.

b. 24" spacing is obviously more comfortable for spectators, but due to the additional floor area required, most public school installations in the state have used the 22" spacing.

c. The cost difference between the two spacings as far as the folding seating itself is concerned ranges from no difference to only a slight premium.

d. A maximum of 16 rows of seating vertically **shall** be allowed without a cross-aisle leading directly to exits.

4. **Rise**

a. Manufacturer "A" — 9⅝" ("standard"), 11⅝" and 16" (the latter requires an intermediate step at each row)*

b. Manufacturer "B" — 10¼" ("standard") and 11½"

c. Manufacturer "C" — 10½" only

* 16" RISE SEATING HAS A CONSIDERABLE ADDED PREMIUM IN COST AND IS NOT AVAILABLE FROM MANUFACTURERS "B" AND "C."

5. **Seats and Skirt Boards**

a. Manufacturers "A" and "C," wood; Manufacturer "B," vinyl-coated steel.

b. Options of moulded plastic seats, chair seating, seat backs, etc., are available but are ordinarily beyond public school budgets.

6. **Decking**

a. "Closed" decks should be specified and are more or less standard with all three manufacturers (material is composition board or plywood).

b. Closed decks are not only safer from a walking standpoint, but prevent trash from falling below and disrupting the rolling mechanism with resultant maintenance problems.

7. **Vertical Aisles**

a. The definition of a vertical aisle as contained herein means a solid walking surface of prescribed width leading from one row of seating to another, rather than an "applique" on a seatboard.

b. Vertical aisles **shall** be required in all installations over six rows high.

c. Despite the above exception, it is recommended that aisles be included in **all** folding seating installations as a matter of safety and convenience; many older persons are afflicted with arthritis and similar disabilities and lack of aisles could constitute an unsafe condition to such persons.

d. Allowable distance between aisles **shall** be maximum of : 20 seats @ 18" = 30'-0"

e. Allowable distance between aisle and dead-end **shall** be a maximum of: 10 seats @ 18" = 15'-0"

f. Required aisle widths **shall** be: for intermediate aisles, 42"; for end aisles, 36".

g. Aisles **shall** be either of the "foot-level" or the "seat-level" type. The foot-level type is recommended in all cases.

h. The foot-level aisles are generally considered safer because the aisle surface is on the same level as the walk surface of each row, whereas in the seat-level type, one has to step down from the aisle to each walk surface, therefore forming an obstruction upon return; the seat-level aisle also requires a removable step at the gym-floor level which projects out and also forms an obstacle.

i. The foot-level aisle installation is also considerably easier to clean, as trash can be swept along the rows uninterruptedly to the aisles and then down the aisles collectively to the gym-floor level. With the seat-level type, trash in each row has to be picked up between each aisle individually because of the aisle obstruction, thereby increasing custodial time for cleaning.

j. The foot-level aisle does have the disadvantage that when in the closed position a "ladder" effect is formed at each aisle location, as this has been an attraction to students in many cases to climb this "ladder"; damage to the seating has occurred therefrom because the seat structure has lost its normal resistance to heavy weight in the closed position. Therefore, when foot-level aisles are used, it is imperative to include the requirement for "integral aisle closures" which eliminate the ladder effect. With Manufacturer "B," the integral aisle closures are standard, and with Manufacturers "A" and "C" they can be added at nominal cost.

k. With Manufacturers "A" and "B," foot-level aisles will cost approximately 3-5 percent more on the entire contract than seat-level aisles, while with Manufacturer "C," it is the reverse and the foot-level aisles are less expensive.

8. **Manual Operation vs. Integral Power Operation**

a. Integral power operation (where all sections are locked together to move as a single unit) is always recommended over manual operation, particularly where there are more than eight rows of seating.

b. Power-operated seating often pays for itself within ten years in maintenance and replacement savings because manual seating is usually operated by students (with predictable lack of care) and mechanism damage will invariably result over a period of time.

c. Manual-operated seating requires 1" to 1½" separation between sections for operating tolerance which of course lets more trash fall beneath the seating than does power-operation, which requires as little as 1/8" separation between sections.

d. Integral power operation will cost approximately 15-35 percent more on the entire contract than manual operation (depending on the manufacturer, size of installation, etc.), but as mentioned above, the life expectancy of the power-operated seating will probably be two or three times that of the manual.

e. To operate power-seating, Manufacturers "A," "B," and "C" all have wall-mounted locked switches (which should always be located in a central position so that the operator has unobstructed view of all seating). Manufacturers "A" and "C" also have an optional pendant switch with a flexible wire that plugs into a socket in the front row of seating in lieu of the fixed wall switch.

9. **Power-Assist Operator** (portable device)

a. Available only from Manufacturers "A" and "B." Much less expensive than integral power operation but not as convenient or satisfactory; may handle seating up to 10 or 11 rows.

10. **Truncated Seating**

a. This is available from Manufacturers "A," "B," and "C" and consists of a section or sections of seating where the first one or more rows are omitted. This design is especially adaptable for providing recesses for wheelchair stations or for team bench seating.

b. Truncated sections will require aisle access from either one or both adjoining side sections. The required railing needed at the front row of truncated sections does not have to be removed for the section to fold up.

11. **Guard Rails**

a. Guard rails **shall** be in accordance with NFPA 102 with the exception that rails are required for all seating where the seats are more than 30" above the floor. Vertical or horizontal spacing of rails **shall** limit the passage of a 9" sphere.

b. Manufacturers vary as to different options of end rails offered, from removable parallel type, to telescoping-parallel and vertical-picket type that permit folding in place.

12. **Installer**

a. It is recommended that specifications mandate that the installer of the seating be factory-trained and approved by the manufacturer.

13. The architect should consult manufacturers' representatives for further detailed data and should also consult NFPA 102 for any additional requirements not stipulated herein.

14. **Alternate Bids**

If a district has a preference for a particular manufacturer's seating due to past experience or due to wishing to match existing seating, or has a preference for wood seats over metal seats, or vice versa, it is recommended that the architect refer to Section 7.05, Item 16, Paragraph b, for recommended procedure for specifying "alternate" bids.

7.10 CONSTRUCTION DOCUMENTS REVIEW PROCEDURE

1. **Review by OSP&B**

a. Final construction documents (one set) **shall** be submitted to OSP&B along with "Application for Approval of Final Construction Documents." (See DIVISION 13—SAMPLE FORMS)

b. After review by OSP&B, a meeting will normally be scheduled with the architect to review the project, except that for small jobs or when changes are very minimal, this may sometimes be done by telephone.

c. After review with the architect, OSP&B **shall** render "approval" or "conditional approval," or may withhold approval of project.

- "Approval" signifies there are no corrections necessary and the project may be advertised.
- "Conditional approval" signifies there are only minor corrections to be made and the project may be advertised provided the architect gives his assurance that corrections will be made promptly and that the corrected documents will be available to bidders the day after advertisement first appears. Corrected documents should simultaneously be delivered or mailed back to OSP&B.
- Withholding of approval signifies that the project shall be returned to OSP&B after corrections are made for a re-review before advertising.

d. Reference the resubmittal of corrected documents to OSP&B, the architect shall decide whether to return a complete set of new documents or just sheets on which changes have been made. All changes **shall** be circled with red pencil or pen, including any changes made between the time of initially submitting review documents and the review date itself.

e. Review of building code and regulatory or statutory requirements by OSP&B **shall not** relieve the architect, as representative of the district, from the ultimate responsibility in regard to all such requirements.

f. The architect or the district **shall not** place a newspaper advertisement for bidding a project before the OSP&B has reviewed the contract documents and issued a verbal or written approval.

2. **Review by Other Agencies**

a. Construction documents **shall** also be submitted to the following agencies for review in addition to OSP&B, unless otherwise waived.

Department of Health and Environmental Control (DHEC)
ETV Staff Engineer
State Insurance Reserve Fund

b. The architect and the plumbing, mechanical, and electrical engineers should refer to DIVISION 14—CHECKLISTS for the summary sheet that states names, addresses, and plan submittal requirements of the agencies listed in Paragraph a preceding. These submittals **shall** be sent directly to each agency by the architect and/or his engineers (with notification of transmittal to OSP&B). The architect and/or his engineers **shall** also be responsible for obtaining all necessary approvals from these agencies and for transmitting copies of same to OSP&B.

c. In addition to the required submissions called for under Paragraph a preceding, it is recommended that the architect contact any municipal or county authorities normally having jurisdiction in the construction locale to ascertain if construction documents also need to be reviewed at that level. Also refer to Section 1.07, Item 2, Paragraph a.

3. If advertising is delayed longer than four months after initial approval of construction documents by OSP&B, the architect **shall** request in writing a new permission to advertise with a statement as to whether there have been any changes in the contract documents since the original approval. If there have been changes, a resubmittal of contract documents **shall** be required.

7.11 ALTERNATE METHODS OF CONSTRUCTION

1. **Multiple Prime Contract Construction** (Construction Management)

The concept under which the multiple prime contract method of construction is permitted for public school work is a system of awarding a series of contracts to various prime contractors, the whole being administered by a construction manager (CM) in lieu of one general contractor as in the single contract system.

a. The construction manager (CM) will be under direct contract to the district or to the architect, at district's option, to perform estimating, managerial, and inspection duties as a supplement to the normal services of the architect.

b. Under construction management, all services and responsibilities of the architect are the same as under the single contract method. The CM **shall** transmit all correspondence through the architect, and any change proposed by the CM **shall** be transmitted to and approved by the architect before submittal to OSP&B.

c. The CM **shall** either be an architect or professional engineer registered in South Carolina or a licensed general contractor in South Carolina (Building Classification) with a cost-of-work limitation not less than the construction cost of the project (a contractor's license can be obtained from the S. C. Contractors' Licensing Board, which is restricted to superintending and/or construction management only, wherein the applicant would not be required to submit a certified financial statement or letter of bonding capability).

The CM **shall** be under the same conflict of interest limitations as other professionals as stipulated in Section 1.06, Item 4.

d. Should this method of construction be chosen, it is most important that the CM be retained at the same time as the architect in order that all decisions concerning construction methods and costs be determined mutually as the design progresses.

However, should the CM not be obtained until near-completion or after completion of the contract documents, any proposed changes at that point **shall** be submitted to OSP&B for approval and/or re-review before any bids are taken.

e. The requirements of this guide, while written primarily for the single contract method of construction, **shall** also apply to each contract of the multiple contract method with the following exception in this division.

- Section 7.05, Item 3: Delete in its entirety.

2. **Construction by a School District**

A district may wish to accomplish small construction or renovation work using their own maintenance forces (and/or possibly vocational students), plus perhaps some outside subcontractors. The district thus acting as its own contractor **shall** be permissible under certain conditions, some of which are mandated by the S. C. Contractors' Licensing Board.

a. Prior approval **shall** first be obtained from OSP&B.

b. Complete architectural and/or engineering services **shall** still be required as outlined in Section 1.06. Exceptions are noted therein.

c. Project financing **shall** be entirely by "local" money if there is any new construction work involved (i.e., a project other than 100 percent renovation work).

d. The qualifications of the person proposed to be the construction superintendent **shall** be submitted to OSP&B for prior review and approval.

e. The cost of the work **shall** not exceed $30,000 if in the realm of general contracting or **$17,500** if in the realm of mechanical contracting unless the person acting as the construction superintendent is properly licensed as a contractor in the applicable category (a contractor's license can be obtained from the S. C. Contractors' Licensing Board, which is restricted to superintending only, wherein the applicant would not be required to submit a certified financial statement or letter of bonding capability).

- The "cost of the work" **shall** be determined by the cost of all materials, labor, subcontracts, and any other direct expenses. This estimated cost may be determined by a detailed estimate prepared by the district or may be estimated by the OSP&B based on the current square foot cost of school construction, adjusted for any anticipated savings.

f. The requirements of this guide, while written primarily for the single contract method of public bid, **shall** also apply to construction by a district with the following exceptions in this division.

- Section 7.03: Delete in its entirety.
- Section 7.05, Items 3, 4, 5, 7, 8, 12: Delete.

However, if the district finds it necessary to subcontract certain portions of the work to private contractors, applicable parts of the preceding sections should be used as a procedural guide.

g. The district should consult legal counsel about contracts, bonds, and insurance requirements for any subcontractors, and also about their own insurance requirements, use of student labor, and any other matters wherein liability could be incurred.

3. Fast Track Construction

The concept under which the "fast track" method of construction will be permitted for public school work is a system of awarding sequential prime contracts for succeeding stages of the work, with the earlier contracts being awarded before the architect has completed all of his construction documents. Comments and requirements follow.

a. "Fast tracking" is permitted for both the single contract concept (i.e., for each component of the work) and also for the construction management concept of construction.

b. Prior notice of the intent to use this method of construction **shall** first be given to OSP&B before the architect proceeds with construction documents.

c. The main advantage of this method of construction is in the saving of time in the overall design/build sequence, but it is not ordinarily recommended for projects in the public sector because the final cost is not known before a binding commitment has to be made.

d. The requirements of this guide, while written primarily for the single contract method of construction, **shall** also apply to each contract of the fast track method except where otherwise waived by OSP&B.

8.01 INDEX OF SECTIONS INCLUDED IN THIS DIVISION

Section Number and Title	Page	Section Number and Title	Page
8.02 Definitions	8-1	8.05 Required Transmittals	8-5
8.03 AIA-AGC Joint Recommendations	8-1	8.06 Alternate Methods of Construction	8-5
8.04 Bidding Procedures	8-1		

8.02 DEFINITIONS

1. Refer to definitions under Section 1.03, Items 1 through 9. Note in particular the paragraph concerning mandates vs. recommendations.

2. **Construction** means the creation of something new, rather than repair or improvement of something existing (Attorney General Opinions, 1954 and 1968).

3. **Renovation** means repair or improvement of something already existing (Attorney General Opinions, 1954 and 1968).

8.03 AIA-AGC JOINT RECOMMENDATIONS

1. It is recommended that the architect consult the "Architect-Contractor Joint Recommendations of South Carolina Chapter, AIA and Carolinas Branch, AGC" as a procedural guide related to the following.

Rec. No. 2	Bid Opening Time
Rec. No. 3	Plan Deposit Guarantee
Rec. No. 4	Number of Sets of Bidding Plans and Specifications
Rec. No. 5	Issuance of Addenda
Rec. No. 6	Error in Bid
Rec. No. 9	Number of Sets of Plans and Specifications for Construction
Rec. No. 20	Prior Approval of Plans for Building Permit
Rec. No. 22	Substitution of Materials During Bidding Period
Rec. No. 25	Award of Contract
Rec. No. 27	Rebid
Rec. No. 30	Invited Bid List

2. A copy of the above publication may be obtained from Building Division Manager, Carolinas Branch AGC, 1100 Euclid Avenue, Charlotte, North Carolina 28203.

8.04 BIDDING PROCEDURES

1. **General**

   a. The bidding requirements outlined in this division **shall** apply to all procurement of bids except for items exempted under Paragraph b following.

   b. The following items of work **shall** be exempt from the bidding requirements of this division if procurement is through separate bids from a building or renovation project. Refer to Section 1.05, Items 3 and 4, and Section 1.06, Item 5.

      Furnishings (desks, chairs, library furniture, etc.)

      Portable equipment (fixed equipment, such as for kitchen and science areas, would not be under this category)

Minor renovation or alteration work, or routine maintenance work

Reroofing projects (if no state funds are involved)

Carpeting or locker installations

Auditorium seating or folding gymnasium seating

Prefabricated walks and canopies, or prefabricated spectator bleachers for outdoor athletic facilities

Relocatable classroom units (requirements for these are contained in a separate publication)

However, in most cases, it is recommended that the district advertise and obtain competitive bids wherever possible, and the requirements of this division may be useful as a procedural guide.

c. For general information, two state statutes (from *Code of Laws of South Carolina, 1976*) that deal with the matter of bidding public school construction are repeated below.

> **§ 59-21-410. Letting of contracts.**
> Any construction to be financed from funds received from the State public school building fund, pursuant to the approval of the Board, shall be on public contract, such contract to be let by the trustees of the school district, and the awarding of the necessary contracts shall be in the sole province of the school district concerned. Contracts shall be let on public advertisement thereof, and on such conditions and within such limitatins as the Board may approve
> **HISTORY: 1962 Code § 21-290; 1952 Code § 21-290; 1951 (47) 564; 1967 (55) 719.**
>
> **§ 10-1-110. State Board of Education must approve certain contracts not awarded to lowest bidder.**
> Where bids are received as a result of advertisement for the construction of public buildings to be built with funds furnished by the State Board of Education and the lowest bid is rejected and another accepted, any contract based on the bid shall be subject to the approval of the State Board of Education.
> **HISTORY: 1962 Code §§ 1-468, 1-468.5; 1959 (51) 122; 1973 (58) 636.**

d. It should be noted that the preceding statutes are applicable only if state "public school building funds" or other monies derived directly from the state (as opposed to "local" bond or tax money) are used to finance, or partly finance, the project. Also, based on past Attorney General opinions, the statutes apply only if the project has some **new** construction in it and are not applicable to 100 percent renovation work.

2. Bid Procurement

The requirements of this guide, while conforming to the previous statutes, are broader in concept and the architect **shall** follow the procedures hereafter outlined for all procurement of bids, unless otherwise excepted, and are applicable regardless of the source of funding.

Description of Project	Bid Requirements	Exceptions
New structures Additions to existing structures Renovation work in conjunction with either of the above New adjunct work (as listed in Section 1.05, Item 2) which is bid as a separate contract.	Thirty- (30-) day minimum advertisement period with three (3) separate newspaper advertisements followed by public bid (No minimum dollar amount is excepted)	If the project is small in scope with few, if any, sub-bidders involved, the advertisement period may be reduced at OSP&B option to as low as eighteen (18) days with only two (2) advertisement notices. If the above exceptions are claimed, the architect **shall** make the request in writing with stated reasons **and prior approval from OSP&B shall be required.**
Renovation work (a self-contained project not associated with a new structure or an addition to an existing structure)	Same as above	Same as above, plus the following additional exceptions which **shall** also require prior approval from OSP&B. Due to the variable and unknown factors inherent in some renovation work, the OSP&B may in some cases grant permission to limit bids to an invited bid list or in some cases to permit negotiations with just one contractor.*

* INVITED BID LISTS ARE RECOMMENDED BY OSP&B IN THE CASE OF ASBESTOS REMOVAL PROJECTS OR FOR OTHER HAZARDOUS TYPES OF WORK WHERE ONLY QUALIFIED CONTRACTORS SHOULD BE CONSIDERED.

CONCERNING INVITED BID LISTS OR NEGOTIATED WORK, NEWSPAPER ADVERTISING IS NOT MANDATED, ALTHOUGH IT IS RECOMMENDED THAT IN THE CASE OF BIGGER PROJECTS ONE NEWSPAPER ADVERTISEMENT BE PLACED TEN (10) DAYS PRIOR STATING THAT THE SELECTION OF A CONTRACTOR IS BEING CONTEMPLATED FOR THAT PARTICULAR PROJECT IN ORDER THAT ANY QUALIFIED AND INTERESTED CONTRACTORS MAY SUBMIT THEIR QUALIFICATIONS FOR CONSIDERATION.

3. Newspaper Advertisements

a. Advertisements for public bids **shall** be published in at least one of the morning newspapers of Charleston, Columbia, or Greenville depending on the geographic location of the project. Advertising in any additional papers may be at the option of the district.

b. Advertisements should preferably be published on Sundays and spaced one week apart.

c. Due to expense of publishing, it is recommended that newspaper advertisements be composed with all possible brevity, giving only the essential information. For instance, bonding requirements on public school work are normally taken for granted by contractors and this and other such superfluous items of this nature might well be omitted.

d. In counting required days for an advertising period, the day the advertisement appears and the day of taking bids may both be included.

4. **Trade Publications and Plan Rooms**

a. In addition to newspaper advertisements, full information regarding the project should be furnished by the architect to appropriate trade organizations for publication in their respective bulletins.

b. Plans and specifications should be provided by the architect to plan rooms of recognized construction trade organizations in the area of the project.

5. **Conflicts of Interest/Rules of Conduct**

a. Refer to Section 1.06, Item 4, concerning conflict of interest of architects, engineers, landscape architects and specialists related to bidding and award.

b. Refer to State Statutes 8-13-410 through 8-13-490 (including 1981 Amendments to 8-13-410 and 8-13-420) concerning rules of conduct of public officials and public employees as may be applicable to bidding and award procedures. It is construed that these statutes apply to both school district personnel and school board members.

6. **Bid Opening and Award**

The following bid opening and award procedures **shall** be followed.

a. All bids **shall** be opened in public at the same time and **shall** be recorded in the minutes of the proceedings.

b. Award **shall** be made to the lowest responsible bidder, taking into consideration satisfactory past performance and quality of workmanship, and whether the bidder's past record indicates reasonable completion of jobs on schedule.

The architect should have listed any alternate prices in his specifications in the order in which it was anticipated that it would be preferable for the district to accept them. However, the district reserves the right to accept "alternates" in any order or combination which serves its best interest and the low bid **shall** be determined on the price combination of the base bid and the accepted alternate prices.

c. The right to reject any or all bids **shall** be reserved by the district if based on valid grounds, including considerations under Paragraph b preceding, or in case of bid "over-run" (i.e., low bid exceeding available funds). Also, any bid may be rejected at the district's option if the bid form is not filled out correctly or is incomplete; however, a bidder's failure to list bidders' or contractors' license numbers on the **outside** of a sealed bid **shall not** be grounds to disqualify the bidder since this same information is required to be on the bid form itself.

d. However, in case the district intends to award to other than the low bidder, the OSP&B **shall** first be notified. In addition, if any state funds are to be used in the financing of the project, Statute 10-1-110 mandates approval by the State Board of Education of a contract to other than the low bidder.

e. In case of bid over-run, it is permissible to negotiate a downward price with the apparent low bidder, but if this process does not reach a satisfactory conclusion, it is recommended that appropriate changes be made to the contract documents and the job re-advertised and re-bid. Also see Section 7.05, Item 3, concerning negotiations with subcontractors that have been required to be named in the bid form.

f. Note from Section 7.10, Item 2, about approval of contract documents required from other state agencies concurrently with that of OSP&B. If these other approvals are unduly delayed for whatever reason, bids may be solicited and, if necessary, opened.

However, construction contracts **shall not** be executed under any conditions until all such approvals have been received in writing.

g. Where items of work are included in the specifications as an "allowance," bids should be solicited in due time by the architect or the general contractor, as the architect may direct. A minimum of three bids should be obtained whenever feasible and possible.

In a case where a district has a preference for, or needs a particular manufacturer's product or equipment, refer to suggested procedures under Section 7.05, Item 16, Paragraph b.

8.05 REQUIRED TRANSMITTALS

The following administrative records of the Bidding and Award Phase **shall** be sent to OSP&B for file.

1. **During bid period**:
   - a. Addenda
   - b. Revised drawings
   - c. Any approvals from other state agencies not previously submitted
2. **Upon award of construction contract**:
   - a. Advertisement for bids (certification from newspaper)
   - b. Addenda (any not sent during bid period)
   - c. Bid tabulations
   - d. Construction contract
   - e. Square Foot Cost Form (see Division 13—SAMPLE FORMS). For new buildings only. Not normally required for additions or renovation work.

8.06 ALTERNATE METHODS OF CONSTRUCTION

1. **Multiple Prime Contract Construction** (Construction Management)

   a. Refer to Section 7.11, Item 1, for general discussion and requirements of the multiple prime contract method of construction and construction management.

   b. The requirements of this guide, while written primarily for the single contract method of construction, **shall** also apply to each contract of the multiple contract method with the following exceptions in this division.

   - Section 8.04, Item 3: Newspaper advertisements for all contracts may be combined into one advertisement listing the various bids to be received.

   - Section 8.04, Item 6: Bids for multiple contracts may be opened on a multi-step basis rather than all at one time.

2. **Construction by a School District**

   a. Refer to Section 7.11, Item 2, for general discussion and requirements of construction by a school district.

   b. The requirements of this guide, while written primarily for the single contract method of public bid, **shall** also apply to construction by a district with the following exceptions in this division.

   - Section 8.03: Delete in its entirety.

   - Section 8.04, Items 1, 2, and 3: Delete in their entirety.

   - Section 8.05, Items 1 and 2: Delete in their entirety.

However, if the district finds it necessary to subcontract certain portions of the work to private contractors, applicable parts of the above sections should be used as a procedural guide. Consult OSP&B.

3. **Fast Track Construction**

   a. Refer to Section 7.11, Item 3, for general discussion and requirements for the "fast track" method of construction.

   b. The requirements of this division, while written primarily for the single contract method of construction, **shall** also apply to each contract of the fast track method except where otherwise waived by OSP&B.

DIVISION 9 CONSTRUCTION PHASE

9.01 INDEX OF SECTIONS INCLUDED IN THIS DIVISION

Section Number and Title		Page
9.02	Definitions	9-1
9.03	AIA-AGC Joint Recommendations	9-1
9.04	Inspection During Construction	9-1
9.05	Requirements During Construction	9-2
9.06	Occupancy Inspection at Substantial Completion	9-2
9.07	Before Occupancy	9-4
9.08	Project Completion	9-5
9.09	Record Drawings	9-5
9.10	Architect's Declaration at Completion	9-6
9.11	Alternate Methods of Construction	9-6

9.02 DEFINITIONS

1. Refer to definitions under Section 1.03, Items 1 through 9. Note in particular the paragraph concerning mandates vs. recommendations.

2. **Substantial Completion**: The date of work or designated portion thereof is certified by the architect as being sufficiently complete, in accordance with the contract documents, so the district may occupy the work or designated portion thereof for the use for which it is intended.

3. **Final Completion**: The date when the architect declares that all work has been completed, all deficiencies corrected, and everything is acceptable in accordance with the contract documents.

9.03 AIA—AGC JOINT RECOMMENDATIONS

1. It is recommended that the architect consult the "Architect-Contractor Joint Recommendations of South Carolina Chapter, AIA, and Carolinas Branch, AGC" as a procedural guide related to the following.

   Rec. No.10—Scope and Responsibility for Punch List Items to Determine Substantial Completion
   Rec. No.14—Preconstruction Conference
   Rec. No.16—Certificate of Substantial Completion
   Rec. No.18—Construction Progress Inspection
   Rec. No.19—Progress Schedules
   Rec. No.23—Substitution of Materials During Construction Period
   Rec. No.28—Cost Breakdown for Change Orders

2. A copy of the above publication may be obtained from Building Division Manager, Carolinas Branch, AGC, 1100 Euclid Avenue, Charlotte, North Carolina 28203.

9.04 INSPECTION DURING CONSTRUCTION

1. It is recommended that on larger multimillion dollar projects, a project representative (sometimes known as the project engineer or "clerk of the works") be retained on the job on a full-time basis, mainly for inspection purposes that are beyond the scope of normal architectural services.

   Such a representative is usually under the direct jurisdiction of the architect rather than the district in order to avoid divided responsibility. The cost of the project representative should be based on a mutual agreement between the architect and district.

2. It is recommended that before basic construction is concealed by ceilings, the OSP&B be notified when all fire protection and fire stopping is complete and ready for an inspection by the appropriate fire authority (this is recommended as an aid to the contractor, architect, and district in identifying possible deficiencies during construction when they can be easily corrected, rather than at occupancy inspection when correction could be difficult and costly). It is recommended that this inspection be made jointly by the local fire authority, OSP&B, contractor, architect, and district. This inspection will be basically concerned with compliance with all fire and building construction codes.

3. See Section 9.06 for occupancy inspection requirements and Section 9.08 for final inspection requirements.

9.05 REQUIREMENTS DURING CONSTRUCTION

1. **Record Drawings**: These **shall** be maintained during the construction phase and delivered to the district at project completion. See Section 9.09 for details.

2. **Administrative Records During Construction**

Copies of the following **shall** be transmitted by the architect to both OSP&B and the district, except as otherwise noted.

At start of construction:

a. Contractor's Cost Breakdown (AIA G702 and G703)

During construction operations:

b. Application and Certificate for Payment (AIA G702 and G703)

- Transmit monthly to the district.
- **No** monthly submission to OSP&B is required except note in Section 9.06 and Section 9.08 that these forms are required to be sent to OSP&B at the substantial completion and project completion stages.

c. Change Orders (AIA G701):

- Fully executed copy of all change orders **shall** be forwarded to OSB&P.
- Prior approval by OSP&B is not required for change orders except where changes are extensive or where monetary value of change order exceeds 10 percent of first $300,000 of contract plus 2 percent of remaining contract, or where in the architect's opinion clarification or interpretation is needed as to whether the changes involve possible violation of rules, regulations, codes, or statutes.
- If prior approval was not requested by the architect, OSB&P upon receipt of the executed change order will then review for adherence to said rules, regulations, codes, and statutes and if exceptions are taken, the architect will be notified and **shall** then take appropriate action.
- The accuracy of change orders as to arithmetic and general equity is the responsibility of the district and architect, and OSP&B will not normally review these aspects of the change order.

9.06 OCCUPANCY INSPECTION AT SUBSTANTIAL COMPLETION

1. **General**

a. Inspection by OSP&B **shall** be required as follows.

- For all student-related facilities if new construction is involved.

- For all non-student-related facilities if new construction is involved, unless of minor scope, in which case inspection shall be optional with OSP&B unless specifically requested by the district.

- Inspection of renovation projects (both student and non-student-related) where no new construction is involved shall be optional with OSP&B, depending on size and complexity of the project, unless inspection is specifically requested by the district.

b. Inspections by Fire Marshal's office, DHEC, and county or municipal authorities do not come directly under the jurisdiction of OSP&B.

c. Inspections by specialty manufacturers' representatives for folding bleachers, fire extinguishing systems, communication systems, lightning protection systems, and such should be made before inspection is requested of OSP&B and in all cases **shall** be made before occupancy.

d. In case of hardship, but only if the architect and general contractor both concur, the district may place furnishings and equipment in buildings before inspection by OSP&B (this is not desirable, however, and should be avoided if possible).

2. **Inspection Procedures**

a. When the architect has made preliminary and/or final punch list and corrections have been completed to the point where the architect can certify substantial completion of the project or portion of project that is ready for occupancy (**life safety features shall be in operation; see Section 9.07 for "conditions of occupancy"**), **he shall**, with the concurrence of the school district, request an occupancy inspection by OSP&B.

b. When the OSP&B receives a request for an occupancy inspection, it **shall** coordinate the inspection with the Fire Marshal's office, the Food Service Division of DHEC, and if applicable, the Office of Vocational Education, and establish a date and time for the inspection.

c. The architect or his engineers **shall** also request permission to put the water and sewer services into use from the District Director of the Environmental Quality Control of DHEC (name available upon request from OSP&B). Water test approval should be received before request for DHEC's inspection is made.

- The water system **shall** be disinfected for 24 hours and two consecutive samples taken 24 hours apart by an approved independent testing laboratory. Both tests shall show freedom from bacteria as set forth by DHEC. Approval by DHEC for putting water and sewer services into use shall be obtained before occupancy, and it is recommended that such approval be obtained before occupancy inspection by OSP&B is scheduled. See Section 10.10, Item 1, Paragraph g.

d. It **shall** be the architects' responsibility to arrange for any county or municipal authority who may also wish to participate.

e. It is desirable to have only the architect, district representative, general contractor, and OSP&B representative present for the inspection (plus Fire Marshal's office, DHEC, and county or municipal representatives previously mentioned).

It is **not** desirable to have the architect's engineers and all sub-contractors follow the inspection, as such numbers become unwieldy, except that a representative of the electrical subcontractor should be present to aid in inspection of the fire alarm system and related life-safety features.

It **is** desirable, however, to have the architect's engineers on the job with the applicable subcontractors at the same time as OSP&B's inspection, but it is preferred that they run independent inspections of their own.

f. Primarily, OSP&B will inspect "life safety" systems (see Section 9.07, Item 2) and features such as fire walls, fire doors, hardware, and the like. Inspecting for general adherence to other specifics of the plans and specifications **shall** fall within the responsibility of the architect.

g. Upon completion of inspection, OSP&B will render an approval, a contingent approval, or withhold approval. Withholding of approval would mean further corrective action on non-complying items, and reinspection if necessary.

3. **Administrative Records at Substantial Completion**

Copies of the following **shall** be transmitted by the architect to OSP&B and to the district at substantial completion.

a. Certificate of Substantial Completion (AIA G704)

- Attach substantial completion punch list and certificate of payment (AIA G702 and G703) certified by architect at substantial completion (no other punch lists are required or desired by OSP&B; punch lists for the district shall be as desired by the individual district).

b. Approvals or substantial completion punch list by DHEC's District Environmental Control Office for water supply and waste water.

c. Approval or substantial completion punch list by DHEC's local food sanitarian for food service facilities.

9.07 BEFORE OCCUPANCY

Before occupancy of a building is permitted, the following conditions **shall** be met.

1. The building or portion of the building to be occupied **shall** be substantially complete. The architect **shall** establish the date of substantial completion in concurrence with the district and at that time **shall** submit a Certificate of Substantial Completion form and punch list as required under Section 9.06, Item 3.

2. All "life safety" systems **shall** be completely operational, including the fire alarm, exit light, emergency power, emergency lighting, fire extinguising and smoke detection systems, and portable fire extinguishers.

   All fire walls and fire-rated walls **shall** be completely sealed and also identified in concealed areas (see Section 7.04, Item 10). Fire doors, dampers, and access doors **shall** be in place and properly installed.

3. The architect or his engineer **shall** obtain approval from the District Director, Environmental Quality Control of DHEC, to put the water and sewer service into use and approval from DHEC's local food sanitarian to put the food service facilities into use.

4. Occupancy approval **shall** have been already requested by the architect from OSP&B and approval rendered by OSP&B.

   a. For general information, the state statute (from *Code of Laws of South Carolina, 1976*) that deals with inspection and approval of school buildings is repeated below.

> **§ 59-23-190. Inspection and approval by State Superintendent of Education.**
> The State Superintendent of Education shall inspect, either in person or by deputy, all school buildings hereafter erected in this State, and his certificate of approval must be obtained before any such building may be occupied.
> **HISTORY: 1962 Code § 21-321; 1952 Code § 21-321; 1942 Code § 5449; 1932 Code § 5455; 1924 (33) 1091.**

   b. The OSP&B has been designated as the "deputy" for the Superintendent of Education in regard to this statute.

9.08 PROJECT COMPLETION

1. The inspection for final completion after the occupancy inspection by OSP&B **shall** be the responsibility of the architect and OSP&B will be available to make another inspection only when specifically requested by the architect or district. A final inspection by OSP&B may be desirable or necessary when size or "occupancy need" has required several partial occupancy inspections.

2. The building **shall not** be occupied before final completion unless the architect, general contractor, and district all concur.

3. If it is necessary to occupy the building before final completion, all aspects of safety **shall** be strictly enforced, such as separating occupants from continuing construction operations. In particular, exits and exit doors, and exit access corridors **shall** be maintained entirely free of scaffolding, storage of materials, or any other obstructions that would impede emergency evacuation of the building.

4. **Administrative Records at Project Completion**
   Copies of the following **shall** be transmitted by the architect to OSP&B and to the district at project completion.

   a. Evidence of permission by DHEC to put the facilities into use for:

      - Water supply
      - Wastewater
      - Food service facilities

      This evidence of approvals to put into use **shall** be obtained and submitted to OSP&B as one submittal.

   b. Consent of Surety to Final Payment (AIA G707j)
   c. Release of Lien (AIA G706A)
   d. Certificate of Final Payment (AIA G707 and G703)
   e. Declaration at Completion Form (OSP&B form)

      - This **shall** be signed by the architect and the plumbing, mechanical, and electrical engineers on one combined form and submitted by the architect. See Section 9.10.

   Copies of the following **shall** be transmitted by the architect to the district **only**, at project completion.

   f. Guarantees and/or bonds
   g. Any operating instructions
   h. Equipment and/or material record data
   i. Record drawings (see Section 9.09)

5. The architect **shall not** certify to the district that final payment is due the contractor until all of the above documents have been sent to OSP&B and the district.

9.09 RECORD DRAWINGS

1. Note from Section 7.05, Item 2, that the architect is required to specify that the general contractor **shall** be responsible for making, and **shall** have his applicable subcontractors make, a careful record of the following during construction operations.

   a. All approved changes from the contract drawings during the course of the job, including accurate dimensions where applicable.

   b. Accurate dimensions locating all below-grade outside utilities (whether changed or not) with reference to permanent above-grade objects.

   The responsibilities relating to plumbing, mechanical, and electrical in this regard is set forth under Divisions 10, 11, and 12.

2. At the completion of the work, the architect **shall** furnish at no cost to the general contractor one unused set of drawings which shall be divided among the general contractor and the plumbing, mechanical, and electrical subcontractors, and on this set of drawings those parties **shall** record neatly with red ink all above-mentioned changes. The general contractor shall reassemble the drawings and deliver them to the architect.

3. The red line changes on the above drawings shall be reviewed by the architect and his appropriate engineers, and when these drawings are approved, the architect **shall** plainly mark them as "record prints" and then deliver them to the district for filing.

4. The district may wish to have the architect prepare a set of "reproducibles" from the record prints in which all recorded changes and dimensions are incorporated. If so, the arrangement for compensation to the architect for this additional service shall be a matter between the district and the architect.

9.10 ARCHITECTS' DECLARATION AT COMPLETION

1. At project completion, the architect **shall** submit to the OSP&B a single form (see Division 13, SAMPLE FORMS) which **shall** be signed by the architect and the plumbing, mechanical, and electrical engineers as to the following declaration.

> This is to declare that the work done for which my firm bears the design responsibility has been reviewed by me or my representative and is, to the best of my knowledge and belief, installed substantially in accordance with the plans and specifications as approved by the Office of School Planning and Building. The installation meets with my approval and acceptance is recommended.

9.11 ALTERNATE METHODS OF CONSTRUCTION

1. **Multiple Prime Contract Construction** (Construction Management)

   a. Refer to Section 7.11, Item 1, for general discussion and requirements of the multiple prime contract method of construction and construction management.

   b. The requirements of this guide, while written primarily for the single contract method of construction, **shall** also apply to each contract of the multiple contract method with the following exceptions in this division:

      - Section 9.05, Item 1, and Section 9.09: The architect **shall** specify that the construction manager assume the duties in regard to record drawings normally required of the general contractor, and the construction manager shall require that each individual contractor be responsible for making a record of all changes under his contract.

      - Section 9.05, Item 2, and Section 9.08, Item 4: Substitute applicable AIA forms relating to construction management for each individual contractor and provide summary form for all contracts (AIA G701/CM, G702, G722, and G723).

2. **Construction by a School District**

   a. Refer to Section 7.11, Item 2, for general discussion and requirements of construction by a school district.

   b. The requirements of this guide, while written primarily for the single contract method of public bid, **shall** also apply to construction by a district with the following exceptions in this division:

      - Section 9.05, Item 2, Paragraphs a and b: Delete.

      - Section 9.08, Item 4, Paragraphs b, c, and d: Delete.

3. **Fast Track Construction**

a. Refer to Section 7.11, Item 3, for general discussion and requirements for the "fast track" method of construction.

b. The requirements of this division, while written primarily for the single contract method of construction, **shall** also apply to each contract of the fast track method except where otherwise waived by OSP&B.

DIVISION 10 PLUMBING

10.01 INDEX OF SECTIONS INCLUDED IN THIS DIVISION

Section Number and Title		Page
10.02	Acknowledgments	10-1
10.03	Definitions	10-1
10.04	General Requirements	10-1
10.05	Codes and Standards	10-2
10.06	Water Supply and Sewage Disposal	10-2
10.07	Submittals to DHEC—Water Supply and Sewage Disposal	10-3
10.08	Water Service Design	10-4
10.09	Exterior Sewer Design	10-5
10.10	Interior Plumbing	10-6
10.11	Cafeterias and Kitchens	10-11
10.12	Energy Conservation	10-11
10.13	Fixtures	10-11
10.14	Working Heights for Fixtures and Accessories	10-13
10.15	Record Drawings	10-14
10.16	Engineers' Declaration at Completion	10-14

10.02 ACKNOWLEDGMENTS

The following division on plumbing work has been prepared with the advice of Mr. Richard Hastings, PE, of Felkel & Hastings, Columbia, South Carolina, with valued assistance from the following:

Mr. Ralph Shealy of Reed-Shealy & Associates, Columbia, South Carolina
Mr. Stuart Clarkson, Office of School Planning and Building

Thanks also go to the following professional engineers for their review of the first draft copy of the document:

Mr. William B. Leland	Charleston
Mr. Harry McKeown	Sumter
Mr. William V. O'Neal	Columbia
Mr. Harold Swygert	Columbia

10.03 DEFINITIONS

1. Throughout this guide, mandated requirements are differentiated from recommendations or commentary as follows:
   a. **Mandates**: Indicated by use of "**shall**" or "**shall not**" (bold type).
   b. **Recommendations** or **commentary**: Indicated by words or phrases such as "should," "may," "it is recommended that," and the like. Any such words or phrases indicate an option that is to be decided by the school district authorities and/or architect.
2. **OSP&B**: Abbreviation for the Office of School Planning and Building, South Carolina Department of Education.
3. **DHEC**: Abbreviation for the South Carolina Department of Health and Environmental Control.
4. Refer to Section 1.03 for other definitions.

10.04 GENERAL REQUIREMENTS

1. The plumbing systems **shall** be designed by a professional engineer, experienced in plumbing design and registered in South Carolina, and the engineer's seal **shall** appear on each drawing for that portion of work for which he bears the responsibility for design. Refer to Division 1—GENERAL REQUIREMENTS for further explanation of responsibilities and related requirements, especially Sections 1.05 through 1.09.

2. The plumbing design **shall** cover all water supply, wastewater, sewage disposal, storm drainage, gas supply, sprinkler, compressed air, and other related systems. It is recommended that the design of all systems under this head normally be the responsibility of a single engineer unless special conditions warrant otherwise.

3. Where future additions are definitely contemplated, water and sewer lines should be sized and stub-outs provided to serve these planned additions. Where future additions are not planned or are unknown, it is recommended that an allowance for a 30 percent increase in school population be made in sizing water and sewer mains, well systems, sewage disposal systems, etc. The district should be consulted about this allowance.

4. **Or Approved Equal Clause: See Section 7.05, Item 16, for information.**

5. Further References: See Sections 7.04, 7.05, 7.06, 7.10, 7.11; and Sections 9.06, 9.07, 9.08, and 9.09 for further procedural information. For distribution of final contract documents for review, refer to Section 7.10, Item 2; and also to Division 14—CHECKLISTS.

6. For more information concerning rules, regulations, or publications of the Department of Health and Environmental Control (DHEC), contact the directors of the following divisions at 2600 Bull Street, Columbia, South Carolina 29201:

   Division of Water Supply
   Division of Domestic Wastewater
   Division of General Sanitation
   Division of Food Protection

10.05 CODES AND STANDARDS

1. Plumbing systems **shall** meet all governing codes, standards, and regulations (editions that are in effect at the time of submission of design development drawings to the OSP&B by the architect), including all rules and regulations of DHEC. Refer to Sections 1.07 and 1.09 of this guide.

   a. Note from Section 1.07, Item 1, Paragraph a, that the basic governing codes are the Standard Building Code, the Standard Plumbing Code, the Standard Mechanical Code, the Standard Gas Code, the Standard Fire Prevention Code, and the National Electrical Code.

   b. Also note from Section 1.07, Item 1, Paragraph b, that where the basic preceding codes or their mandated references do not adequately provide for every contingency, conformance with other nationally recognized and accepted standards **shall** be evidence of compliance with the intent of this guide; the provisions of such standards should be followed unless deviation is approved by OSP&B. Such references include, but are not necessarily limited to, the following:

      - National Plumbing Code by ASME
      - Code for Energy Conservation in New Building Construction (jointly prepared by BOCA, ICBO, and SBCCI codes)
      - Fire Extinguishers: NFPA 10
      - Water Heaters—Gas Fired: IRM Insurance Company (or Factory Mutual accepted up to 2,000,000 BTU)
      - Piping, Fittings, and Installation: Applicable ANSI and ASTM standards

10.06 WATER SUPPLY AND SEWAGE DISPOSAL

The engineer **shall** ascertain, before commencing his design, as to the type of water supply and sewage disposal systems that DHEC will approve for the particular project.

1. **Water Supply**

   a. Water supply **shall** be from a public system, if it is accessible, and technically and economically feasible, or

b. Water supply **shall** be from an on-site well, only after public water supply is found to be not feasible.

- Well water shall meet all bacteriological, physical, and chemical requirements as set forth in the DHEC publication, *State Primary Drinking Water Standards*, and plans and specifications **shall** thoroughly cover the proposed installation in accordance with these regulations.
- Well system **shall** provide water in the amounts tabulated below.

Building (no cafeteria or gym)	10 GPD/person
Building with cafeteria (no gym)	15 GPD/person
Building with cafeteria and gym	20 GPD/person

- It is recommended that the well system be designed and constructed under a separate contract, prior to advertising for construction of the building itself, to insure adequacy of water. If a prior well contract is not feasible, however, and since the characteristics of well water are, of course, unknown before drilling, it is recommended that any additional costs of treatment or changes in design necessary to meet DHEC requirements be borne as an extra cost by the district rather than including a possible excessive "allowance" in the contract documents.

2. **Sewage Disposal**

a. All school sewage effluent **shall** discharge into a municipal or other public sewage system, or to an alternate system approved by DHEC. If a municipal or public system is not available, the engineer **shall** request approval from DHEC for one of the following methods of disposal.

- Septic Tank: Design in accordance with DHEC "Individual Waste Disposal System Regulations and Standards." For additional information, contact Division of General Sanitation.
- Packaged Treatment Plant: Design in accordance with DHEC "Rules and Regulations for Packaged Treatment Plants." For information, contact Division of Domestic Wastewater, Community Section.

b. All waste from kitchen areas **shall** discharge through a grease trap.

10.07 SUBMITTALS TO DHEC FOR WATER SUPPLY AND SEWAGE DISPOSAL

The following information **shall** be transmitted to DHEC, along with submittal of final contract documents (See Section 7.10, Item 2).

1. **For Water Supply**

a. Completed "Application for Permit to Construct" signed by the school district and the engineer.

b. Where water is obtained from a public system, a letter from the water supplier agreeing to furnish water to the school. Water pressure and flow tests **shall** be obtained and reported as follows.

(1) Static pressure ____________________
(2) Flow pressure ____________________
(3) Flow ____________________ (Flow at 500 GPM + flow to proposed building)
(4) Residual pressure ____________________
(5) Date and time of test ____________________

c. Where water supply is obtained from a well system, a complete design package for the system with anticipated pressures and flows.

d. Water flow calculations prepared by the engineer, including number of fixture units, gallons/minute, and all other pertinent data.

e. Submit data for public system or well to Division of Water Supply.

2. **For Sewage Disposal**

a. Completed "Application for Permit to Construct" signed by the school district and the engineer.

b. Where sewage is discharged to a public system, obtain a letter from the sewer authority agreeing to treat the sewage from the school, the NPDES permit number of the plant accepting the waste, design flow, and present flow of any lift stations through which waste will pass, discussion of any problems at the plant or within that portion of the collection system accepting the waste, and the effects of the increased flow from this project. Submit data to Division of Domestic Wastewater, Community Section.

c. Where sewage is not discharged to a public system, submit complete data and design package of proposed disposal system. For septic tanks, submit to Division of General Sanitation. For packaged treatment plant, submit to Division of Domestic Wastewater, Community Section.

10.08 WATER SERVICE DESIGN

1. The water system **shall** be designed on the minimum street pressure or minimum pressure at the pneumatic well system pressure tank.

2. Maximum recommended water velocity should be 8 fps.

3. Underground water-piping materials **shall** be as listed below and in recommended order of preference.

   a. Type "K" hard drawn copper tubing with wrought copper fittings, soldered with 95-5 solder.

   b. Schedule 40 PVC, ASTM D-1785 and D-2241, pressure pipe and fittings, solvent cement joints, all with NSF seal of approval.

   c. Schedule 40 galvanized steel pipe with galvanized malleable iron fittings (protect threads from external corrosion), except that galvanized pipe **shall not** be used on any piping 2½" and smaller, nor with well systems, nor where adverse soil conditions occur.

4. A cut-off valve **shall** be installed in each branch take-off from the water main. Valves 3" and larger **shall** be AWWA approved. Valves 2½" and smaller **shall** be of good quality and of the non-rising stem type.

5. Dielectric fittings **shall** be used where dissimilar materials join in the piping system.

6. Concrete thrust blocks and anchors **shall** be placed in lines to prevent movement at bends on all pipe 3" and larger. Piers **shall** be installed to support pipe where required by soil conditions.

7. Clearances and other requirements of water lines in relation to sewer lines **shall** conform to DHEC standards.

8. Water mains **shall** have 30" minimum cover.

9. All flux, solder, dirt, cement, etc. **shall** be removed from all lines by flushing so as to leave lines clear for disinfecting.

10. A backflow preventer **shall** be installed in the water supply main if required by DHEC or the local water authority.

11. **Fire Hydrants**

  a. Where schools are located within the jurisdiction of, or are served by, a local fire department, fire hydrants and their connections **shall** meet the requirements of that fire authority.

  b. Where schools are located outside the jurisdiction of a fire authority and where water supplies are adequate, the provision of fire hydrants should be considered to provide for fire protection of buildings and reduced insurance premiums.

  c. Hydrants shall be in accordance with applicable NFPA manual.

12. **Laboratory Water Test**: The entire outside waterline service system **shall** be disinfected and tested in the same manner as prescribed for interior waterlines. See Section 10.10, Item 1, Paragraph g.

10.09 EXTERIOR BUILDING SEWER DESIGN

1. Building sewers and building drains **shall** be 4" to 6" pipe, sized in accordance with fixture unit method described in Standard Plumbing Code.

2. Common sewers (where two or more building sewers tie together) **shall** be 8" minimum size.

3. All sewers **shall** have 3'-0" minimum cover, or cast-iron pipe **shall** be used.

4. All pipe **shall** be sloped as follows.

4" and 5" size	@ 1/8" per foot minimum
6" size	@ 0.67 percent minimum
8" size	@ 0.33 percent minimum

Maintain a minimum velocity of 2 fps, with a maximum velocity of 10 fps in all sewer lines. Where a slope exceeds 13 percent, concrete anchors are recommended.

5. A manhole **shall** be installed in sewer lines 8" and larger at all changes in grade, alignment, or pipe size, and at intersection with 6" lines or larger. A drop manhole **shall** be installed where invert differential between influent and effluent lines exceeds two feet.

Length of "reaches" between manholes **shall not** exceed 300', with a maximum of 200' recommended.

6. Clearances and other requirements of sewer lines in relation to waterlines **shall** conform to DHEC standards. Vertical separation between water and sewer lines **shall** equal or exceed 18", with water **above** sewer.

7. Infiltration/exfiltration **shall not** exceed 200 gallons/day/inch of pipe diameter/mile of pipe.

8. Profiles for all sewer lines **shall** show invert elevations, ground level, slope, length of lines, manhole cover elevations, and utility crossings.

9. Sewer pipe materials **shall** be as listed below, in order of preference.

  a. Cast-iron pipe/joints: ANSI A21.1; A21.6; A21.8; A21.10; and A21.11

  b. PVC Pipe: ASTM D-3033 or D-3034; Installation—ASTM D-2321

  c. Vitrified Clay Pipe: ASTM C-700; Joints—ASTM C-425; Installation—ASTM C-12

  d. Other materials may be considered for approval by OSP&B.

10.10 INTERIOR PLUMBING

All interior plumbing **shall** be designed in accordance with the Standard Plumbing Code, except as otherwise noted herein.

1. Water Piping

a. Water Piping Materials

- Water piping below floor slab on grade or below ground **shall** be Type "**K**" hard drawn copper tubing with wrought copper fittings soldered with 95-5 solder.
- Water piping within the building (above slab on grade or above ground) **shall** be Type "L" hard drawn copper tubing with wrought copper fittings, 95-5 solder, for 4" size and smaller. For size 5" and larger, Schedule 40 galvanized steel pipe with galvanized cast-iron or galvanized malleable-iron fittings may be used in lieu of copper.

b. A reduced pressure backflow preventer **shall** be installed in the water supply line serving science areas, the make-up water supply line to boilers, air conditioning equipment, and other mechanical equipment. Reduced pressure backflow preventer drain **shall** be piped to a floor drain or accommodated in other approved manner.

c. A main cut-off control is recommended to be located under each science instructor's table for master control of water to the sinks used by students in that room. Remote valve, electrically held open, with switch at the instructor's desk, is acceptable in lieu of valve itself at instructor's desk.

d. A hose bibb with vacuum breaker **shall** be installed in each "gang toilet" and in gym locker toilet areas.

At least one hose bibb with hot and cold water mixing valve and with vacuum breaker **shall** be installed in each kitchen area, or a threaded faucet with a vacuum breaker on the mixing valve on a service sink or floor receptor fitting will be acceptable, if conveniently located.

A vacuum breaker **shall** be installed at any faucet to which a hose may be attached.

e. Exterior hydrants **shall** be the anti-freeze type with backflow preventer, and it is recommended that they be provided at strategic locations, and at approximately 100' intervals around the perimeter of the building.

f. Water Pipe Pressure Test: All water piping **shall** be proven tight under 150 psi hydrostatic pressure for two hours without loss of pressure before being covered. Blank-off equipment not designed for this test. All joints **shall** be proven tight.

g. Laboratory Water Test: The entire water system, including hot water lines, **shall** be filled with a solution containing 50 ppm of available chlorine and allowed to stand 24 hours before flushing. At the end of the 24-hour retention period, the treated water **shall** contain no less than 24 mg/l chlorine throughout the system. After the chlorine has been completely flushed from the system, a testing laboratory approved by the engineer **shall** take two samples of water on consecutive days and make analysis to determine efficiency of the disinfection process. Test results **shall** be sent to the engineer, architect, and plumbing contractor. Should any reports be unfavorable, the entire treatment and sampling process **shall** be repeated.

2. Hot Water Systems

a. Hot water generating and distribution systems may be designed as single or multiple systems as hereinafter noted.

b. Hot water supply **shall** be furnished to the following.

- All kitchen facilities, as required by DHEC, including handwashing lavatories, hose bibb, can wash facility, etc.
- Lavatories and sinks in health rooms
- Sink serving the "snack" area of kindergartens (not the student-used sink, however)
- Handwashing facilities in industrial arts, prevocational and T & I vocational shops
- Sink in library workrooms
- Photography darkrooms
- Custodial areas and janitors' closets
- Home economics facilities
- Health and cosmetology teaching facilities
- Gym dressing room showers and lavatories

Hot water supply is optional for the following (consult district).

- Science laboratories
- Lavatories in teachers' and administrative toilet areas
- Sinks in teachers' lounges and workrooms
- Art classrooms
- Business/office education areas

Hot water is **not** recommended for the following.

- Lavatories primarily for student or public use
- Classroom counter sinks

c. Kitchen hot water system.

- A separate and independent hot water generating and distribution system for domestic use **shall** be provided for new school kitchens and also existing kitchens when present domestic hot water heating systems are replaced. These systems are to provide hot water for kitchen areas only.

- See *Rules and Regulations Governing Food Service Establishments and* **also** *Installation Methods for Food Service Equipment*, published by DHEC, for water heater size, booster water heater size and piping, hot water recirculation pump, connections to dishwashers, etc. Temperature-pressure gauges, pressure-reducing valve, shock absorbers, pressure-relief valve, etc., **shall** be provided as required by DHEC, for the booster water heater.

- An exception to the requirement for an independent hot water system may be made, provided a thermal storage system is designed and engineered as a source of heat of sufficient capacity to provide all hot water demands simultaneously for the entire building. The use of such a system **shall** require prior approval from DHEC, along with submittal of design criteria.

d. Relief valves from water heaters **shall** terminate so as not to be a hazard to students or personnel.

- Water heaters of 20 gallons or less may discharge, with proper air gap, into a janitor's sink or floor receptor.

- Water heaters of more than 20 gallons, but not more than 80 gallons, should discharge to a floor drain.

122

- Water heaters of more than 80 gallons should discharge to the exterior above grade, terminating with an elbow turned down and protected against insect encroachment. Relief piping **shall** maintain a continuous grade with no traps. All heaters with exterior discharge should also have a secondary relief valve piped to a floor drain.

e. It is recommended that in cases where only a moderate amount of hot water is needed, consideration be given to the use of an "instant-flow point-of-use" heating device on the line in lieu of a conventional water heater. Sinks in kindergartens, library workrooms, teachers' lounges and workrooms, health rooms, and photography darkrooms may be among those areas considered for this.

f. A mixing faucet for hot and cold water **shall** be installed in the can wash area of kitchens.

3. Soil, Waste, Vent and Roof Drain Systems

a. Underground or underfloor soil, waste, and vent piping **shall** be service weight cast-iron bell and spigot pipe with caulked or compression gasket joints unless "pH" of soil dictates other materials or protection of cast-iron to eliminate deterioration due to soil conditions. If such soil conditions exist, special attention should be given to the adequacy of the proposed alternate system for underground and under-slab installations.

b. Soil, waste, vent, and roof drainage piping within the building above ground **shall** be cast-iron bell and spigot with caulked joints or cast-iron "no-hub" pipe and fittings, except that vent and roof drainage lines may be galvanized steel or schedule 40 PVC pipe and fittings with solvent cement joints in lieu of cast-iron (PVC pipe, however, **shall not** be used within fire-rated floor, wall or ceiling systems where combustibles are prohibited).

c. Acid-resistant waste and vent piping serving science areas **shall** be extra-heavy silicon iron, fire-resistive polypropylene, or borosilicate glass pipe and fittings, and **shall** extend to a point where line is washed by heavy flow of water. Use of dilution chambers should be considered in large science complexes to eliminate long runs of acid-resisting piping. Mechanical joint piping **shall not** be used below floor slab on grade, or below ground.

d. Horizontal soil and waste piping shall be sloped as follows.

3" and less size	@ 1/4" per foot minimum
4" and 5" size	@ 1/8" per foot minimum
Larger than 5" size	@ slope to insure a computed effluent velocity of not less than 2 feet per second

Velocity **shall not** exceed 10 fps in sewer lines.

e. Dishwashers should not be directly connected to the sanitary sewer system. Exception: a direct connection will be permitted provided a floor drain is installed on the same line and adjacent to connection.

f. Floor Drains

- Floor drains **shall** be installed in conjunction with each internal hose bibb in all gang toilets, gym dressing rooms, and kitchens; also in other areas normally washed down or subject to receiving overflow water from equipment, such as condensation water, pressure relief water or steam, dishwashers and other indirect waste, drainage from backflow preventers, equipment rooms, etc.
- Floor drains in kitchen areas **shall** be provided adjacent to and outside the walk-in cooler door, at the vegetable peeler, and at other pertinent locations, with floor graded to drains.

- Floor drains in kitchen can wash areas **shall** be installed in conjunction with the mixing faucet and **shall** be located in the area immediately below the faucet. Drain line from the floor drain in the can wash area **shall** be 4" minimum size. Floor slope to drain **shall** be l/4" per foot minimum and 5/8" per foot maximum. Discharge from this area **shall** drain into an approved grease trap.

- It is recommended that floor drains not be installed for emergency eyewash and shower units in science areas so as not to encourage false use.

g. All Drainage Pipe Testing: Piping of drainage and venting systems **shall** be tested with not less than a 10-foot head of water before being covered. Each opening **shall** be filled with water. Water **shall** be kept in system for at least 15 minutes before inspection starts and system **shall** then be proven tight at all points. Perform smoke test if required by engineer or code.

4. Gas Piping

a. Gas piping **shall** be installed in accordance with the Standard Gas Code, Chapter III for natural gas and Chapter IX for L.P. gas. Piping **shall** be installed as indicated below or as otherwise permitted by the Standard Gas Code (SGC), the Standard Fire Prevention Code, NFPA 54, and NFPA 58. See referenced sections from the Standard Gas Code in the following paragraphs.

b. Gas piping outside building below grade **shall** be plastic-coated steel pipe with welded joints using a primer and protective tape at each joint. Piping **shall** be specially made for gas piping. See Section 306.

c. Gas piping **shall not** be installed in earth below building or below slab on grade unless it is run in a casing of steel pipe.

However, in the instance of a slab on grade, an alternate installation **shall** be permitted in which the gas piping is run in a plastic casing which in turn is completely embedded in the concrete slab; the slab **shall** be sufficiently thickened to give a minimum of 2" protection top and bottom around the casing. The plastic casing **shall** be approved for use with the particular gas involved. See Paragraph h following, for suggested outline of such an installation.

In either type of installation, casings **shall** be properly sealed and vented to the outside and the code furthermore requires that the gas piping can be removed from the casing for replacement, etc. See SGC Section 803, subsection "Buried Housepiping."

d. Gas piping within the building above ground or above slab on grade may be installed exposed, or in furred space or pipe chase, or in area between floors or in attic area (see exceptions below).

e. All gas piping located in areas noted in paragraphs c and d preceding, **shall** be black steel pipe ANSI B36.10-70, or Type "K" or "L" seamless copper watertube ANSI H23.1-1970 with flared or soldered joints with at least l,000° F. melting point, except that where used in casing in earth below building or below slab on grade, steel pipe **shall** have an approved coating on the outside to protect it against moisture. See SGC Section 308, subsection "Piping in Concrete or Masonry Floors."

f. Gas piping **shall not** be run in elevator shafts, chimneys, ventilating or air conditioning ducts, or air handling plenums or building spaces used as plenums unless enclosed in steel casing and properly vented. See SGC Section 309.

g. A main cut-off control **shall** be located under each science instructor's table (where gas is used) for master control of gas to all the outlets used by students in that room. Remote valve, electrically held open, with switch at instructor's desk, **shall** be acceptable in lieu of valve itself at instructor's desk.

h. Where slab on grade construction occurs and the science room is on ground floor and below-floor gas piping is used, the following suggested installation is recommended as an alternate method of construction as allowed by Standard Building Code Section 103, subsection "Alternate Materials and Alternate Methods of Construction."

- Provide manual cut-off valve at exterior L.P. tank or service of natural gas. Run exterior line as required by code.

- Run gas pipe through casing up to valve box in exterior wall of science room. Face access door to valve box to interior.

- Provide in valve box a manual cut-off valve and an electric cut-off valve that is spring-loaded to close on interruption of electric power. Provide electric switch at teacher's desk to interrupt power and close valve. Interconnect electric valve to close when fire alarm is initiated. This electric valve **shall** cut off all gas service within individual science room and electric valve **shall** be opened only with a manual reset button.

- Run gas pipe through casing back to outside. Make distribution to individual underfloor service lines outside of building.

- Run service lines in plastic conduit encased in concrete (see Paragraph c preceding) in straight runs to serve lines of science tables. Interconnect plastic conduit and vent to exterior.

- Provide drop boxes in floor, under each desk, so that service tee is exposed within the drop box. No tees, joints, or other fittings **shall** be permitted below floor level except at a drop box. Interconnect plastic conduit around drop boxes to provide continuous venting of all conduits to outside.

- Gas service for any wall counters is recommended to be installed exposed or in furred space or pipe chase in lieu of underfloor service.

- See Division 15—REFERENCE MATERIAL for sketch drawing indicating layout of above described system.

i. Gas Pipe Testing: Pipe and conduit testing **shall** be done before piping or conduit is concealed in furred or otherwise inaccessible spaces. Testing **shall** be done in accordance with the Standard Gas Code. See SGC Sections 309 and 311.

5. **Sprinkler Systems and Standpipes**

a. Attention is called to the architect of the increased areas and travel distances permitted by code where sprinklers are used, and also to situations where sprinkling of certain areas is required by code.

b. Sprinkler systems and standpipes **shall** be designed and installed in accord with SBC Section 901, "Sprinklers"; Section 902, "Standpipes"; and Section 903, "References"; NFPA 13 for sprinkler systems; NFPA 14 for standpipes, and also Chapter 18 of the Standard Fire Prevention Code.

c. Sprinkler systems **shall** also meet the requirements of IRM Insurance Company. Three copies of the shop drawings and specifications **shall** be sent to that company at 15 North Broadway, White Plains, New York 10601 for prior review and comment.

6. **Compressed Air Piping**

Compressed air piping **shall** be Schedule 40 black steel with malleable-iron fittings or Schedule 40 galvanized pipe with galvanized malleable-iron fittings, or Type "L" hard drawn copper tubing with wrought copper fittings. Copper pipe and fittings between compressor and tank are not recommended.

10.11 CAFETERIAS AND KITCHENS

1. Special attention **shall** be given by the engineer to the requirements of DHEC that pertain to food handling, storage, preparation, and serving; he will also need to be concerned with hot water temperature, water volume, dishwashing machines, and other special purpose facilities.

2. Plumbing design **shall** be in accordance with the DHEC publications, *Rules and Regulations Governing Food Service Establishments* and *Installation Methods for Food Service Equipment*.

10.12 ENERGY CONSERVATION

1. Domestic hot water **shall not** be stored at more than 120° F except that higher temperatures may be used in the following cases:

   a. Where required by DHEC, in which case the higher temperature systems **shall** be separate from other hot water systems.

   b. Where systems do not use new energy for heating the water.

   c. Where high temperature thermal storage systems are designed for off-peak electrical heating, or where solar heating has sufficient energy storage capabilities to be energy efficient and is sufficiently insulated.

2. A seven-day time clock or microprocessor **shall** be used to operate hot water heating systems serving kitchens and gymnasiums, and also any other heaters of large capacity.

3. The engineer may wish to consider a seven-day time clock, microprocessor, or manual switch to operate smaller water heaters of low use.

10.13 FIXTURES

1. **General**

   a. The engineer's attention is called to Sections 3.06 through 3.11, 3.13, 3.14, and 3.16 of this guide, where various fixtures are mentioned.

   b. Refer to Section 10.14 hereafter for recommended setting heights of fixtures.

   c. Resistance to vandalism and abuse should be uppermost in the engineer's mind when specifying fixtures and their methods of installation.

2. **Fixtures**

   The following fixture list is intended to encompass the fixtures in common use throughout the school, but does not include special fixtures in such areas as science labs and kitchens, for example.

   a. Water Closets: **Shall** be standard flush valve, elongated type with open-front seats, except that round-front models **shall** be used in kindergarten toilet areas and in individual classroom toilets of grades 1 and 2. Tank-type water closets **shall** only be allowed where water pressure is insufficient for flush valves.

   b. Urinals: **Shall** be standard types, wall-hung, and elongated where placed to serve the physically handicapped. Note from Section 3.13 that trough urinals **shall not** be permitted except in football stadium toilet rooms (manual valve wash-down is recommended in that case).

c. Lavatories: **Shall** be standard acid-resisting enameled cast iron or 18-gallon (minimum) stainless steel. Where only cold water is to be furnished, single drilling should be specified. Lavatories should project no more than 18" from wall. Precast or stainless steel wash fountains **shall** be acceptable in lieu of lavatories on a two station equals two lavatories, etc., basis; the engineer should draw on his experience concerning the choice between foot controls at the floor as against mounting the controls at the top of the unit.

d. Sinks: **Shall** be standard acid-resisting enameled cast iron or 18-gallon (minimum) stainless steel. All counter sinks in the classrooms of elementary schools **shall** be "classroom" type with gooseneck fitting on one side and drinking bubbler on other (except that in kindergartens, a single kitchen-type sink with swing-faucet should be used if a second sink for the food preparation area is provided; see Section 3.07, Item 3). Note from Section 3.06, Item 4, that a lever arm wrist control fitting should be specified for the countertop sink in health rooms. In shop areas, where a "wash-up" is provided in the open shop area, consideration may be given to the use of wall-mounted multiple-station wash sinks in lieu of individual lavatories or semicircular wash fountains, an an economy measure.

e. Drinking Fountains/Water Coolers: **Shall** be standard wall-hung types. Refer to Section 3.13, Item 14, and Section 3.16, Item 4. Note from the first reference where the use of drinking fountains are recommended in lieu of water coolers. Note from the second reference that units are restricted to a 12" projection into corridors but this may depend on corridor width and location of the unit; there is some flexibility in this requirement, plus the possibility of a wall recess if need be. Push-front controls are recommended for **all** units so that separate accommodations will not have to be made for the physically handicapped.

f. Shower Facilities: Refer to Section 3.13, Item 4.

g. Floor Receptors: It is recommended that pre-cast floor receptors with rim guards be used in all custodial (janitor) closets rather than the traditional service sink. A wall-mounted faucet with hot and cold water, vacuum breaker, hose fitting, and a 3' section of hose should be provided; mount faucet high enough to get cleaning buckets under. Refer to Section 3.14, Items 7 and 8.

3. Special attention **shall** be given to the method of mounting all fixtures with regard to resistance to vandalism or abuse.

a. Water Closets: All wall-hung water closets **shall** be mounted on heavy-duty concealed carriers.

b. Lavatories:* All wall-mounted lavatories or sinks **shall** be either mounted on heavy-duty concealed carriers, heavy-duty wall-mounting brackets with through-wall bolts and backplates, or heavy-duty brackets mounted directly to concrete-filled block work with structural fasteners such as "red-head" type fastened into the concrete fill. Standard light-weight pressed steel mountings with screws and ordinary shields into the surface of the block **shall not** be permitted.

c. Urinals: Heavy-duty mounting comparable with that designated for lavatories **shall** be provided.

d. Water Coolers: Mounting similar to that designated for lavatories is recommended. Coolers should be located and walls prepared for mounting during construction operations.

* NOTE TO ARCHITECT: WHERE A COUNTERTOP LAVATORY DESIGN IS CONTEMPLATED IN STUDENT TOILET AREAS, THE COUNTER SHOULD BE STRONG ENOUGH TO RESIST ONE OR MORE STUDENTS SITTING ON IT.

10.14 WORKING HEIGHTS FOR FIXTURES AND ACCESSORIES

1. In secondary schools, the dimensions in the following table as listed under the column "7-12 and Others" are designed to meet the state requirements for the physically handicapped, but are equally suitable for the non-handicapped, and are, therefore, recommended for use in **all** toilet facilities of secondary schools.

2. In elementary schools, the dimensions in the other three columns (K, 1-3, 4-6) should adequately serve the handicapped and the non-handicapped alike from a practical standpoint, although they do not technically meet state requirements for the physically handicapped in one or two cases. Therefore, the architect should incorporate the dimensions in the column "7-12 & Others" in at least one male and one female toilet on each floor of an elementary school to meet state requirements.

3. **Recommended Heights Above Floor for Fixtures and Accessories**

GRADE STRUCTURE**

Item	Kinder-garten	1-3	4-6	7-12 & Others	Remarks
Round Front Water Closet (to rim)	13" or 15"	15"*	-	-	For individual classroom toilets Prefer 13" ht. in kindergarten
Elongated Water Closet (to rim)	-	*	15"	15"	
Urinal (to lip)	-	*	17"	17"	Not required in individual cl/rm toilets
Lavatory (to rim)	25"	28"*	31"	33"	
Sink and Work Counter (to top)	25"	27"	30"	36"	See exception to 36" ht. in Section 4.03, Item 3, Paragraph f
Drinking Fountain/ Water Cooler (to rim)	-	27"	30"	33"	***
Toilet Paper Holder (to center)	21"	21"	21"	21"	
Soap Dispenser (above lavatory)	-	-	-	6"	Dispensers not recommended for student or gang toilets
Paper Towel Dispenser or Electric Hand Drier (to bottom)	36"	36"	36"	36"	
Mirrors 24" x 36" (to bottom)	-	*	36"	36"	Applicable only to "gang" or physically handicapped toilets
Grab Bar for Physically Handicapped (to center)	-	*	33"	33"	

* INDIVIDUAL TOILET ROOMS ARE REQUIRED IN KINDERGARTEN AND GRADES 1-2, BUT ARE OPTIONAL WITH THE SCHOOL DISTRICT FOR GRADE 3. WHERE GRADE 3 WILL BE SERVED BY A GANG TOILET, WORKING HEIGHTS SHOULD BE SAME AS GRADE 4-6 CATEGORY.

** IF THE GRADE STRUCTURES 4-6 AND 7-12 SHOULD OVERLAP EACH OTHER IN THE SAME SCHOOL, CONSULT OSP&B.

*** IN ELEMENTARY SCHOOLS, THE HEIGHT OF A DRINKING FOUNTAIN/WATER COOLER SHOULD BE SELECTED BY ITS LOCATION IN THE BUILDING AND THE AGE GROUP TO BE SERVED; IN ANY CASE, HOWEVER, AT LEAST ONE FOUNTAIN/COOLER SHOULD BE SET AT 33" IN THE MAIN PUBLIC AREA OF THE BUILDING TO SERVE ADULTS AND THE PHYSICALLY HANDICAPPED.

ALSO IN ELEMENTARY SCHOOLS, THE DIMENSIONS OF THE "BUBBLERS" ON COUNTER SINKS WILL BE DETERMINED BY THE REQUIRED COUNTER HEIGHT.

10.15 RECORD DRAWINGS

1. The plumbing engineer **shall** specify that during construction operations the plumbing contractor **shall** faithfully make a record of all approved changes from the contract drawings, including accurate dimensions where applicable, and **shall** also record accurate dimensions locating all below-grade outside plumbing utilities (whether changed or not) with reference to permanent above-grade objects.

2. The engineer **shall** also specify that at completion of the work all such changes **shall** be recorded neatly with red ink by the plumbing contractor on an unused set of the plumbing contract drawings supplied by the architect. The red line changes **shall** be reviewed by the engineer and the completed record prints returned to the architect.

3. The plumbing engineer **shall** contact DHEC for requirements of submission of record drawings where changes have been made from the original design.

4. See Sections 7.05 and 9.09 for related record drawing requirements.

10.16 ENGINEER'S DECLARATION AT COMPLETION

1. At project completion, the architect **shall** submit to the OSP&B a single form (See Division 13—SAMPLE FORMS) which **shall** be signed by the architect, and the plumbing, mechanical and electrical engineers as to the following declaration:

   > This is to declare that the work done for which my firm bears the design responsibility has been reviewed by me or my representative and is, to the best of my knowledge and belief, installed substantially in accordance with the plans and specifications as approved by the Office of School Planning and Building. The installation meets with my approval and acceptance is recommended.

2. Also at project completion, the plumbing engineer **shall** write a letter to the appropriate district office of DHEC in which he **shall** make the same declaration as in Item I preceding.

11.01 INDEX OF SECTIONS INCLUDED IN THIS DIVISION

Section Number and Title	Page
11.02 Acknowledgments	11-1
11.03 Definitions	11-1
11.04 General Requirements	11-2
11.05 Codes and Standards	11-2
11.06 Equipment	11-3
11.07 Ventilation	11-4
11.08 Kitchens	11-5
11.09 Energy Conservation	11-6
11.10 Life Cycle Energy Study	11-7
11.11 Record Drawings	11-8
11.12 Engineer's Declaration at Completion	11-8

11.02 ACKNOWLEDGMENTS

The following division on mechanical work has been prepared with the advice of Mr. Harold Reed, PE, of Reed-Shealy & Associates, Columbia, South Carolina, with valued assistance from the following.

Mr. Louis Felkel, PE, of Felkel & Hastings, Columbia
Mr. Harry McKeown, PE, Sumter
Mr. Stuart Clarkson, Office of School Planning and Building

Appreciation is expressed to Mr. Jack Jenkins, PE, of Jenkins & Associates, West Columbia, for his collaborative section on energy conservation.

Thanks also go to the following professional engineers for their review of the first draft copy of the document:

Mr. Ray C. Clark	Charleston
Mr. Wade Crowe	Spartanburg
Mr. Fred Dunagan	Taylors
Mr. Walton C. Hotinger	Columbia
Mr. William B. Leland	Charleston
Mr. Coleman C. Owens, Jr.	Charleston
Mr. George B. Rast	Charleston
Mr. Harold Swygert	Columbia
Mr. C. P. Thomas, Jr.	Columbia
Mr. David P. Whitesides	Florence

11.03 DEFINITIONS

1. Throughout this guide, mandated requirements are differentiated from recommendations or commentary as follows.
   a. **Mandates**: Indicated by use of "**shall**" or "**shall not**" (bold type).
   b. **Recommendations** or **commentary**: Indicated by words or phrases such as "should," "may," "it is recommended that," and the like. Any such words or phrases indicate an option that is to be decided by the school district authorities and/or architect.
2. **OSP&B**—Abbreviation for the Office of School Planning and Building.
3. Refer to Section 1.03 for other definitions.

11.04 GENERAL REQUIREMENTS

1. The mechanical systems **shall** be designed by a professional engineer, experienced in mechanical design and registered in South Carolina, and the engineer's seal **shall** appear on each drawing for that portion of work for which he bears the responsibility for design. Refer to Division 1—GENERAL REQUIREMENTS, for further explanation of responsibilities and related requirements, especially Sections 1.05 through 1.09.

2. The mechanical design **shall** include all heating, air conditioning, ventilation, fire-extinguishing systems (other than sprinkler systems), kitchen exhaust and make-up air system with associated extinguishing system and hoods, and other related systems, and it is recommended that it all be the responsibility of a single engineer.

   Exception to Items 1 and 2 above: While there is a strong preference to have the mechanical engineer include the kitchen hood and its exhaust and make-up air requirements within his design (because of its interrelation to other kitchen ventilation), it will not be forbidden for the hood package to be a part of an overall kitchen equipment design if a recognized independent kitchen consultant is being retained for that phase of the work. The architect, however, must insure proper coordination between the two.

3. In the design of a new building where future additions are definitely contemplated, the capacities of any equipment allowing for such additions should be clearly noted on the drawings, along with any other pertinent information such as points of future connections, etc.

   Where additions are unplanned or unknown, the architect should consult the district as to what allowance for future enrollment growth should be made as it may relate to any applicable equipment or other provisions related thereto.

4. Separate heating/cooling systems should be provided for the administrative area of the school so as to provide economical operation during times when only this part of the building is in use. Other zoning is also recommended where night or summer use may be anticipated.

5. Or Approved Equal Clause: See Section 7.05, Item 16, for information.

6. Further references: See Sections 7.04, 7.05, 7.06, 7.10, 7.11, and Sections 9.06, 9.07, 9.08, and 9.09 for further procedural information.

7. For more information concerning rules, regulations, or publications of the Department of Health and Environmental Control (DHEC), contact the directors of the following divisions at 2600 Bull Street, Columbia, South Carolina 29201:

   Division of General Sanitation
   Division of Food Protection

8. For transmittal of final contract documents to DHEC, refer to section 7.10, Item 2, and also to Division 14—CHECKLISTS.

11.05 CODES AND STANDARDS

1. Mechanical systems **shall** meet all governing codes, standards, and regulations (editions that are in effect at the time of the architect's submission of design development drawings to the OSP&B), including all rules and regulations of DHEC and also the "South Carolina Building Energy Efficiency Standard Act." Refer to Sections 1.07 and 1.09 of this guide.

   a. Note from Section 1.07, Item 1, Paragraph a, that the basic governing codes are the Standard Building Code, the Standard Plumbing Code, the Standard Mechanical Code, the Standard Gas Code, the Standard Fire Prevention Code, and the National Electrical Code.

b. Also note from Section 1.07, Item 1, Paragraph b, that where the basic preceding codes or their mandated references do not adequately provide for every contingency, conformance with other nationally recognized and accepted standards **shall** be evidence of compliance with the intent of this guide; the provision of such standards should be followed unless deviation is approved by OSP&B. Such references include, but are not necessarily limited to, the following.

- Duct, Fire Dampers, Air Conditioning and Ventilating Systems: NFPA 90A
- Removal of Smoke and Grease-Laden Vapors from Commercial Cooking Equipment: NFPA 96
- Rangehood Fire-Extinguishing Equipment: Standard for Dry Chemical Extinguishing Systems: NFPA 17
- Oil-Burning Equipment: NFPA 31
- Blower and Exhaust Systems: NFPA 91
- IRM Insurance Company: Combustion Controls Spec. 205
- ASHRAE 90
- ASHRAE Standard "Energy Conservation in New Building Design"
- "Code for Energy Conservation in New Building Construction" (jointly prepared by BOCA, ICBO, and SBCCI codes)

11.06 EQUIPMENT

1. Floor-mounted heating and air conditioning equipment is very desirable from the standpoint of good air distribution and the minimization of cold drafts and cold air stratification near the floor. Floor-mounted equipment, however, within occupied spaces also receives the greatest amount of abuse from students (especially in secondary schools), takes up floor space, and requires changing filters more often than at some other locations. These points should be considered in selecting a mechanical system for any project.

2. Self-contained, unitary air conditioning equipment is acceptable where applicable. However, such equipment should be very carefully evaluated with respect to life expectancy, capacity limitations, ventilating capability, and noise factors. It is recommended that where this type of equipment is used, "spares" be supplied as directed by the district for future maintenance needs.

3. Rooftop HVAC equipment should have special attention given to:

   a. The prevention of water leaks either through the manufacturer's equipment, the duct installed by the contractor, the equipment supports, or due to routine equipment maintenance. Refer to Section 7.06, Items 10 and 11, for further recommendations.

   b. Structural coordination for units of different manufacturers.

   c. Electrical wiring requirements of units of different manufacturers.

4. Window-type air conditioning units are not recommended, and should be used only for special applications.

5. Ductwork should not be installed exposed to the weather, except in special limited applications.

6. The location of mechanical equipment should be carefully considered as related to noise, vibration, cleanliness, and heat release to the space. It is very desirable to locate large boiler and chiller rooms in a separate building.

7. See Section 3.15 for related information concerning locations and other requirements for boiler and equipment rooms.

8. Pipes venting gas from appliances or other devices shall terminate outside the building.

9. There **shall** be no open-flame heaters, open-coil electric heaters, or spark-producing electric components in areas likely to be used for spray painting or where there will be open containers of gasoline or other explosive vapors or dust.

10. Boilers and pressure vessels **shall** be ASME-labeled and installed in accordance with the American Society of Mechanical Engineers "ASME Boiler and Pressure Vessel Code." Boiler rooms and installation of boilers shall conform to Section 806 of Standard Building Code.

11. Each hot water boiler **shall** have a low-water cutoff and each steam boiler **shall** have an extra-low-water cutoff. Low-water cutoff should be manually reset type.

12. Combustion controls **shall** meet the requirements of Improved Risk Mutual Insurance Corporation, IRM Spec. 205. Three copies of shop drawings and specifications **shall** be sent to Improved Risk Mutual, 15 North Broadway, White Plains, New York 10601 for prior review and comment.

13. Equipment **shall** be ASME Code-stamped, AGA-labeled, or UL-labeled as and when applicable.

14. Hot water relief valves, refrigerant relief devices, and steam pop-off safety valves **must** be piped to locations to minimize danger to personnel or students upon relief. Hot water relief valves should be piped to exterior or to funnel-type floor drains located near the equipment. Steam safety valves should be piped to the roof with provisions to keep the relief line drained of water. See Section 10.10 for related plumbing information.

15. Where oil is used for fuel, No. 2 fuel oil is recommended.

11.07 VENTILATION

1. Minimum ventilation should be in accordance with the ASHRAE Guide as published at time of submission of architect's design development drawings.

2. Special thermostatically controlled ventilation should be provided in boiler and mechanical rooms to prevent excessively high temperatures.

3. Shop ventilation should be designed so that an effective cooling sensation is produced on the occupants due to velocity of air movement. It is recommended that non-overloading low static pressure exhaust fans be provided with manual controls so that the roll-up doors may be partially opened and the exhaust fans energized when desired.

4. The heating of make-up air for welding shops is not recommended from an economical standpoint.

5. Work areas for internal combustion engines **shall** have provisions so that exhaust gases can be exhausted directly to the outside by a carbon monoxide exhaust system.

6. Paint spray rooms **shall** have special treatment with respect to ventilation and safety requirements. Paint spray booths, commercial type, are recommended. If the booth is not to be used and a paint spray room is desired, the engineer and the architect **shall** investigate thoroughly with respect to codes and standards. See Standard Building Code, Section 407; Standard Fire Prevention Code, Chapters 19 and 20; NFPA 30; NFPA 33; and NFPA 70.

7. The storage of flammable or combustible liquids **shall** be in UL-labeled cabinets with mechanical ventilation, or in storage rooms designed for the purpose. If a flammable or chemical storage room is needed, the engineer and the architect **shall** investigate thoroughly with respect to codes and standards. For flammable or combustible storage, see SBC, Section 407; Standard Fire Prevention Code, Chapter 20; NFPA 30; and NFPA 70. For hazardous chemical data and reactions, see NFPA 49 and NFPA 491M.

8. It is recommended that a separate exhaust fan be provided for each chemistry or physical science laboratory and be of such capacity as to be able to quickly remove objectionable odors. A fan is also desirable in a biology lab, but not needed as critically as in the former two areas; a fan would not be needed in a separate physics lab.

9. It is recommended that either air conditioning or sensible velocity cooling by means of fans be provided for gymnasiums.

10. Separate mechanical ventilation systems **shall** be provided for all gymnasium dressing rooms to minimize objectionable odors. Such systems **shall** be separate from any system installed primarily for comfort.

11. Mechanical ventilation **shall** be provided for all toilet rooms, for janitor's closets, and for storage rooms where odors could become a problem. Gang toilets **shall** have 2 CPM per square foot minimum ventilation.

12. Either mechanical or gravity ventilation should be provided in all bookrooms that are used for summer storage of textbooks. See Section 3.12.

13. Provision **shall** be made to prevent sound transmission through any common duct system serving more than one area, such as adjoining toilet rooms.

14. In addition to the minimum ventilation standards recommended in the ASHRAE Guide, in schools without air conditioning, mechanical ventilation in classrooms and other areas of lengthy occupancy **shall** be designed so that an effective cooling sensation is produced on the occupants due to the velocity of the air movement. The district may wish to consider the use of paddle fans for this purpose, provided ceiling heights permit; see Section 3.19 for required clearance above floor.

15. See Section 11.08 following for further reference to kitchen ventilation.

11.08 KITCHENS

1. Kitchen ventilation **shall** be designed and installed in accordance with the DHEC publications, *Rules and Regulations Governing Food Service Establishments* and *Installation Methods for Food Service Equipment*.

2. Automatic fire-extinguishing systems **shall** be installed in all hoods. Upon activation of the extinguishing system, all fuel **shall** be shut off, whether gas or electric, and will include fuel to all equipment under the hood, including fryers, broilers, griddles, and ranges. Make-up air **shall** be shut off, but exhaust fans **shall** continue exhausting. Exhaust fans **shall** have an adjustable high limit shutdown switch normally set at 350°. The fire-extinguishing system **shall** be designed in accordance with the Standard Mechanical Code, Section 307; NFPA 96; NFPA 17; and the DHEC publication, *Installation Methods for Food Service Equipment*.

   The fire-extinguishing system **shall** also meet the requirements of IRM Insurance Company and the architect **shall** forward three sets of the shop drawings and specifications to that company at 15 North Broadway, White Plains, New York 10601, for review and approval prior to installation of the system.

3. Rangehood roof exhaust fans **shall** be designed to prevent air from being discharged down toward the roof.

4. It is recommended that make-up air for the kitchen rangehood not be heated unless it is proven economically feasible.

5. Food storage rooms **shall** be ventilated. It is recommended that these areas be ventilated by means of introducing outside fresh air near the floor and expelling exhaust air through the roof, all by gravity flow. Controllable dampers or grilles should be used in order that openings may be controlled in winter.

6. Exterior entrances to kitchens shall be equipped with a fly fan with automatic switch geared to opening and closing of door, unless otherwise waived by OSP&B. Location of fan on interior with air directed down and towards door is preferred, but district should be consulted.

11.09 ENERGY CONSERVATION

1. **General Requirements**

   The requirements of ASHRAE Standard "Energy Conservation in New Building Design" **shall** be complied with in the design of all new and renovated facilities, except that the following considerations concerning roof/ceiling "U" factors are recommended to take precedence over this ASHRAE standard.

   a. The roof/ceiling "U" factor should not exceed .05.

   b. When above-ceiling air return is used, the roof deck "U" factor shall not exceed .05.

   c. Exceptions may be made for Paragraphs a and b above on special designs where the roof structure is utilized for solar collection or natural lighting.

2. **Design Considerations**

   a. The engineer **shall** make every effort to provide a system design with maximum utilization of energy conservation measures, consistent with functional requirements of the building. Close coordination between the mechanical engineer, electrical engineer, and architect in the interest of energy conservation **shall** be required. Refer to ASHRAE Standard "Energy Conservation in New Building Design" for design temperatures and related factors.

   b. Consideration should be given to sizing mechanical equipment for quick "pick-up" to permit shutting down the heating systems during off-hours; however, also take into consideration the possible penalty where the "pick-up" adds to the maximum electrical demand to such an extent that it would affect the electrical rate structure.

   c. Consideration should be given to lowering the design levels for heating of shops, kitchens, gymnasiums, and similar areas of physical activity.

3. **Temperature Controls**

   a. Seven-day program clocks or microprocessors with reserve springs or batteries **shall** be installed to energize systems corresponding to their routine hourly usage schedule with override switches and/or low-limit thermostats provided to override. Ventilation air dampers should not open during warm-up cycles or when heating is energized by the low-limit device.

      A manual "on/off" switch in a convenient location may be used where applicable for small isolated systems in lieu of a seven-day time clock.

   b. Thermostats in general should be installed in locations, and so constructed or protected, so as to discourage the changing of their set points except by authorized personnel. The architect **shall** determine the type of thermostat (with reference to accessibility of changing set point) that is desired by the school district.

   c. It is recommended that combination heating/cooling thermostats be of the "two lever" type, with the lever on the lower temperature scale to energize the heating cycle components when the temperature drops below its setting, and the level on the upper scale to start the cooling cycle when the temperature rises above its set point. Thermostats **shall** be constructed so as to prevent settings that could cause the heating and cooling cycle to be energized at the same time.

d. In order to prevent drafts and discomfort when rooms are to be controlled at a temperature lower than 72° F, air should not be circulated other than that required for minimum ventilation.

4. **HVAC Equipment**

a. The engineer should not use reheating or air blending systems that are inefficient in energy use to control room temperature.

b. It is recommended that systems with economizer cycles be used where possible, for the energy savings and the effect on health through the reduction of airborne bacteria count.

c. It is recommended that low-leakage type outdoor air dampers be used to minimize air infiltration during off-hours.

d. It is recommended that no heating or cooling be provided in corridors, stairwells, interior restrooms, or storage rooms unless specifically directed by the school district.

5. **Electric Resistance Heaters**

a. Electric resistance heaters should **only** be used for comfort heating where indicated by a life cycle cost study to be most economical. However, they may be considered for use, even where not indicated by a life cycle cost study, in the following cases.

- In small isolated areas requiring heat only
- When used as backup heating for heat pumps, solar systems, etc.

11.10 LIFE CYCLE ENERGY STUDY

1. It is strongly recommended to the school district that the services of a mechanical engineer registered in South Carolina be secured to provide a computerized life cycle cost analysis in the early design stage for all new schools and major additions or renovation projects. Such a study would require additional engineering costs above the normal design fee paid by the architect to the engineer, but the potential savings to the district over the years should outweigh the additional fee many, many times over.

Such an analysis should include several alternate integrated studies of construction costs, the effects of building construction materials, building orientation, lighting, usage schedules, fuels, HVAC equipment, maintenance costs, and other factors that relate to the initial capital cost of the building versus the annual operating costs.

2. The life cycle costs study should include (but not necessarily be limited to) the following estimates for each alternate study.

a. The initial cost of the mechanical system, including electrical work and miscellaneous building costs related to the mechanical system.

b. First year utility costs for the following:

Heating energy
Cooling energy
Interior building lighting
Domestic hot water
All other energy sources

c. Yearly cost estimates for each year of the life cycle for the following:

Utility cost
Maintenance cost
Principal cost
Insurance cost

d. Total average owning and operating cost.

3. All systems that are considered under the category of research and development should have a computerized or longhand life cycle analysis performed by a mechanical engineer. This would include active solar designs.

11.11 RECORD DRAWINGS

1. The mechanical engineer **shall** specify that during construction operations the mechanical contractor **shall** faithfully make a record of all approved changes from the contract drawings, including accurate dimensions where applicable, and **shall** also record accurate dimensions locating all below-grade outside mechanical utilities (whether changed or not) with reference to permanent above-grade objects.

2. The engineer **shall** also specify that at completion of the work all such changes **shall** be recorded neatly with red ink by the mechanical contractor on an unused set of the mechanical contract drawings supplied by the architect. The red line changes **shall** be reviewed by the engineer and the completed record prints returned to the architect.

3. See Sections 7.05 and 9.09 for related record drawing requirements.

11.12 ENGINEER'S DECLARATION AT COMPLETION

1. At project completion, the architect **shall** submit to the OSP&B a single form (see Division 13—SAMPLE FORMS) which **shall** be signed by the architect and the plumbing, mechanical, and electrical engineers as to the following declaration:

> This is to declare that the work done for which my firm bears the design responsibility has been reviewed by me or my representative and is, to the best of my knowledge and belief, installed substantially in accordance with the plans and specifications as approved by the Office of School Planning and Building. The installation meets with my approval and acceptance is recommended.

DIVISION 12 ELECTRICAL

12.01 INDEX OF SECTIONS INCLUDED IN THIS DIVISION

Section Number and Title		Page
12.02	Acknowledgments	12-1
12.03	Definitions	12-1
12.04	General Requirements	12-2
12.05	Codes and Standards	12-2
12.06	Power Service/Distribution	12-3
12.07	Lighting	12-4
12.08	Emergency Power	12-5
12.09	Exit Signs	12-6
12.10	Emergency Lighting	12-6
12.11	Fire Alarm System	12-7
12.12	Fire Alarm Operation	12-9
12.13	Kitchen Exhaust Hood	12-11
12.14	Communication Systems	12-12
12.15	Provisions for Educational Television	12-12
12.16	Provisions for Teaching Equipment	12-12
12.17	Lightning Protection	12-12
12.18	Energy Conservation	12-13
12.19	Record Drawings	12-13
12.20	Engineer's Declaration at Completion	12-13

12.02 ACKNOWLEDGMENTS

The following division on electrical work has been prepared with the advice of Mr. Guy White, III, PE, of Tectonics Engineering Consultants Inc., of Columbia, South Carolina, with valued assistance from the following.

Mr. Carroll Holladay, PE, of Holladay, Coleman, Williams & Associates, Columbia
Mr. John Myers, PE, Columbia
Mr. Stuart Clarkson, Office of School Planning and Building

Thanks also go to the following professional engineers for their review of the first draft copy of the document.

Mr. Thomas S. Armour, Jr.	Columbia
Mr. Ray C. Clark	Charleston
Mr. William H. Copenhaver, III	Greenville
Mr. John C. Evans, Jr.	Columbia
Mr. H. Buford Goff, Jr.	Columbia
Mr. Joseph Holladay	Augusta, Georgia
Mr. William B. Leland	Charleston
Mr. Coleman C. Owens, Jr.	Charleston
Mr. George B. Rast	Charleston
Mr. C. P. Thomas	Columbia
Mr. David P. Whitesides	Florence

12.03 DEFINITIONS

1. Throughout this guide, mandated requirements are differentiated from recommendations or commentary as follows.
   a. Mandates: Indicated by use of "**shall**" or "**shall not**" (bold type).
   b. **Recommendations** or **commentary**: Indicated by words or phrases such as "should," "may," "it is recommended that," and the like. Any such words or phrases indicate an option that is to be decided by the school district authorities and/or architect.
2. **OSP&B**: Abbreviation for the Office of School Planning and Building, South Carolina Department of Education.
3. **DHEC:** Abbreviation for the South Carolina Department of Health and Environmental Control.
4. Refer to Section 1.03 for other definitions.

12.04 GENERAL REQUIREMENTS

1. The electrical systems **shall** be designed by a professional engineer, experienced in electrical design and registered in South Carolina, and the engineer's seal **shall** appear on each drawing for that portion of work for which he bears the responsibility for design. Refer to Division 1—GENERAL REQUIREMENTS for further explanation of responsibilities and related requirements, especially Sections 1.05 through 1.09.

2. The electrical design **shall** cover all lighting, power, emergency, communications, and related systems. It is recommended that the design of all systems under this head normally be the responsibility of a single engineer unless special conditions warrant otherwise.

3. Where future additions are definitely contemplated, electrical service and related equipment should be sized and stub-outs provided to serve these planned additions with all such information shown on drawings.

   Where future additions are not planned or are unknown, it is recommended that an allowance for a 30 percent increase in school population be made in sizing electrical service and related equipment that would be affected by an increased population. The district should be consulted about this allowance.

4. Or Approved Equal Clause: See Section 7.05, Item 16, for information.

5. Further References: See Sections 7.04, 7.05, 7.06, 7.10, 7.11, and Sections 9.06, 9.07, 9.08, and 9.09 for further procedural information. Also refer to Section 11.10 concerning recommended life cycle energy study.

6. For further information concerning rules, regulations, or publications of the Department of Health and Environmental Control (DHEC), contact this agency at 2600 Bull Street, Columbia, South Carolina 29201.

7. See Section 10.10, Item 4, concerning possible use of electrical controls for central gas shut-off valves in science laboratories.

8. **For distribution of final contract documents for review, refer to Section 7.10, Item 2, and also to Division 14—CHECKLISTS.**

12.05 CODES AND STANDARDS

1. Electrical systems **shall** meet all governing codes, standards, and regulations (editions that are in effect at the time of the architect's submission of design development drawings to the OSP&B), including all rules and regulations of DHEC, and also the "South Carolina Building Energy Efficiency Standard Act." Refer to Sections 1.07 and 1.08 of this guide.

   a. Note from Section 1.07, Item 1, Paragraph a, that the basic governing codes are the Standard Building Code, the Standard Plumbing Code, the Standard Mechanical Code, the Standard Gas Code, the Standard Fire Prevention Code, and the National Electrical Code (NFPA 70).

   b. Also note from Section 1.07, Item 1, Paragraph b, that where the basic preceding codes or their mandated references do not adequately provide for every contingency, conformance with other nationally recognized and accepted standards **shall** be evidence of compliance with the intent of this guide; the provision of such standards should be followed unless deviation is approved by OSP&B. Such references include, but are not necessarily limited to, the following:

      - National Electrical Safety Code: ANSI C2
      - Life Safety Code: NFPA 101
      - NFPA 96

- Location Protection Signaling Systems; NFPA 72A
- ASHRAE 90
- U.L.Standards
- ANSI Standards
- NEMA Standards
- Rules and Regulations for the South Carolina Board of Barrier-Free Design
- "Code for Energy Conservation in New Building Construction" (jointly prepared by BOCA, ICBO, and SBCCI codes)

12.06 POWER SERVICE AND DISTRIBUTION

1. Mechanical and electrical equipment room requirements and related information are set forth under Section 3.15.

2. The engineer **shall** coordinate with power supplier and indicate and/or specify all requirements for:

   a. Point of service

   b. Division of work (contractor and power company)

   c. Fault current: Over-current device(s) **shall** have interrupting capacity in excess of available fault current throughout system.

3. The engineer should determine and evaluate electric power rates and costs which are applicable to the project and should advise the school district on matters regarding billing, demand charges, and costs associated with electric service.

4. **Wiring Methods**: Wiring methods **shall** be insulated conductors in raceways for all systems, including power, remote control, ETV, signal, and communications.

5. **Aluminum Conductors**

   a. At the option of the engineer, but **only** with the concurrence of the school district, aluminum conductors may be provided for conductors #2 AWG and larger. Conductors smaller than #2 AWG **shall** be copper only.

   b. Where aluminum raceways are provided, they **shall not** be installed underground, or encased in concrete, or be used with brass or bronze fittings.

6. **Grounding**: Grounding **shall** be provided in accordance with NFPA 70.

7. **Ground Fault Protection**: Ground fault protection **shall** be provided in accordance with NFPA 70 and for all receptacles (convenience outlets) installed outdoors.

8. **Receptacles** (Convenience Outlets)

   a. Every full-size instructional classroom **shall** be provided with a minimum of five duplex receptacles, located to best serve anticipated equipment such as TV, projection equipment, record and tape players, and countertops. Smaller instructional areas should be provided with receptacle quantities at the discretion of the engineer.

   b. Science laboratories, home economics departments, business education departments, shops, and other instructional areas where a considerable amount of electrical equipment is to be used should be provided with outlets of the proper type and number to meet the needs of each area. In such areas, consideration should be given to providing a main disconnecting means to enable the disconnection of all instructional electrical loads from the power supply (lighting not included) and should be provided unless obviously not needed for safety or control, or if not desired by the school district.

c. Office areas and teachers' workrooms should be supplied with at least four electrical outlets located to best serve anticipated needs.

d. Receptacles should be properly located throughout the building for cleaning equipment and other similar uses.

e. A minimum of one duplex receptacle **shall** be provided on the interior near the top of the ladder serving the scuttle to the roof area.

f. All receptacles **shall** be of the Specification Grade type.

12.07 LIGHTING

1. Illumination Levels

a. Lighting calculations **shall** be based on room surface reflectances for interior finishes selected by the architect, which in all cases **shall not** be less than the following for instructional areas (see Section 7.04, Item 15).

Ceiling Cavity—80 percent   Walls—50 percent   Floor Cavity—20 percent

b. Lighting calculations: The illumination levels shown in the table below are recommended minimum **initial** design levels.*

Type of Interior Areas	Recommended Minimum Initial Design Level*	Remarks
All interior areas other than listed below	70 foot-candles	Multipurpose rooms and auditorium stages need 70 foot-candles at full bright dimmer setting.
Industrial art, prevocational or Trade and Industrial shops, laboratory and lecture room demonstration areas, and task lighting areas	100 foot-candles	
Administration and office areas and gymnasiums	50 foot-candles	
Cafeterias and commons, stairways, and auditorium seating areas	30 foot-candles	Auditorium seating areas need 30 foot-candles at full bright dimmer setting.
Corridors, toilet areas, gym dressing rooms, storage rooms and boiler, mechanical or electrical equipment rooms	25 foot-candles	

* LIGHTING CALCULATIONS BY ENGINEERS DURING YEARS PAST HAVE MOSTLY BEEN BASED ON **MAINTAINED** DESIGN LEVELS, RATHER THAN **INITIAL** DESIGN LEVELS. THEREFORE, IN USING THE ABOVE INITIAL DESIGN LEVELS, THE ARCHITECT AND THE ENGINEER SHOULD CAUTION A DISTRICT THAT A STRICT MAINTENANCE PROGRAM SHOULD BE ADHERED TO AS TO RELAMPING AND CLEANING OF FIXTURES AND LENSES.

c. Fixture selection and placement should provide the minimum practical amount of brightness and glare.

d. Due to constantly changing lighting technology, special designs not strictly adhering to the preceding recommended light levels, but still meeting the lighting needs in the engineer's opinion, will not be prohibited but should have prior approval of the OSP&B.

e. Consult Illuminating Engineering Society's *Lighting Handbook* for recommended illumination levels for other uses and any other additional pertinent information.

2. **Lighting Control**

   a. Room switches should be placed in the most convenient location, preferably on the strike side of the entrance door to the area served.

   b. Some of the lighting in large areas, such as cafeterias, gymnasiums, auditoriums, and similar spaces, should be separately controlled by a switch located on the strike side of the entrance doors at a minimum of two locations.

   c. The engineer should consider, where practical, multiple levels of switching as an energy conservation measure so that when recommended illumination levels in Section 1, Paragraph b, preceding are not needed, lower levels can be used. Supplemental task lighting may be also considered.

   d. "Local" switching for gang toilets **shall not** be permitted.

3. **Exterior Lighting**

   a. Exterior lighting should be provided for building entrances, parking areas, outdoor storage areas, loading docks, bus ports, covered walkways, and other outdoor areas where, in the judgment of the engineer, lighting is required for night functions, security, or safety.

   b. The engineer should specify the most energy-efficient lamp source in each instance, consistent with color rendition and other application requirements. Refer to Section 12.18 on energy conservation.

4. **Lighting System Security**: All practical measures should be taken to provide protection for lighting fixtures and equipment.

   a. Vandal-resistant materials or metal guards should be considered for fixtures within reach of floor and for all outdoor locations.

   b. Mounting heights should be specified to afford protection, consistent with ease of maintenance.

   c. Exit signs and directional signs related thereto should be wall-mounted (either recessed or surface) where possible in lieu of ceiling-mounted, as ceiling-mounted signs are subject to a much greater degree of abuse. Signs must be visible from anywhere within the length of exit access corridor or directional signs **shall** be provided. See Section 7.04, Item 19.

12.08 EMERGENCY POWER

1. **Mandated Emergency Power**: The following systems **shall** be provided with a primary and a secondary (emergency) power source.

   a. Exit signs
   b. Emergency lighting
   c. Fire alarm system

2. **Recommended Emergency Power**: The following systems are recommended to have primary and secondary power sources, but it is not mandated.

   a. Classroom sound/intercom system
   b. Telephone switching power
   c. Intrusion detection system (if provided)

3. **Sources of Emergency Power**: The primary source of power **shall** be the normal building distribution system. The secondary (emergency) power source **shall** be one of the following.

   a. Engine-generator set
   b. Central or local rechargeable battery system (dc)
   c. Central or local battery-inverter system (ac)
   d. Single battery packs
   e. Battery packs integral with the fixture
   f. Any other type of system permitted by the National Electric Code except connection ahead of main and separate service

4. The emergency power from a secondary system, such as a generator set or a central battery source, **shall** be on separate circuitry and in separate conduit from normal power and lighting. The emergency power **shall** be compatible with the system served and as required by that system.

12.09 EXIT SIGNS

1. Exit signs and directional signs related thereto **shall** be provided with power from two sources.

   a. The primary source may be connected before or after the main building disconnect. If connected after the main disconnect, the primary source **shall** be connected either at the main service or at a feeder distribution panel. The secondary source **shall** operate automatically upon interruption of the primary source and may be served from any emergency power source as listed under Section 12.08, Item 3.

   b. The primary and secondary systems **shall** be on separate circuitry and in separate conduit from normal power and lighting from the feed point to the sign.

2. Exit signs and directional signs related thereto **shall** be provided at all exit doors and as required to mark egress routes that provide egress for 50 or more persons. See SBC Sections 1121 and 1122 for other requirements.

12.10 EMERGENCY LIGHTING

1. Emergency lighting **shall** be provided with power from two sources.

   a. The primary source may be connected at any point within the normal lighting system. The secondary source **shall** operate automatically upon interruption of the primary source and may be served from any emergency power source as listed under Section 12.08, Item 3.

   b. The power from a secondary system such as a generator set or a central battery source **shall** be on separate circuitry and in separate conduit from normal power and lighting.

2. The following areas **shall** have emergency illumination, whether having natural lighting or not.

   Exits and exit access corridors
   Small and large assembly areas
   Areas occupied by over 50 persons
   Gymnasium dressing rooms
   Band and choral rooms
   Industrial arts, prevocational and T & I shops
   Administration or other building control centers
   Kitchens
   Gang toilets
   Main electrical service disconnect location
   Emergency power equipment location

3. The following areas **shall** have emergency illumination when they either have no natural light or are anticipated to have night occupancy.

   Classrooms and other instructional spaces over 200 sq. ft. in size
   Flexible or open-plan areas
   Spaces over 500 sq.ft. in size which are expected to have regular human occupancy

12.11 FIRE ALARM SYSTEM

1. Fire alarm systems **shall** be provided for the following.

   a. All new buildings

   b. All new additions to existing buildings

      - Where the area of a new addition to an existing building exceeds 50 percent of the existing building area, the new fire alarm system **shall** meet the requirements of this section and where the existing fire alarm system does not meet the requirements of this section, the existing system **shall** be upgraded to meet the requirements of this section.

      - Where the area of a new addition to an existing building is more than 25 percent, but not more than 50 percent, of the existing building area, the new fire alarm system **shall** meet the requirements of this section and the existing fire alarm system may remain in effect. The existing system **shall** be functional, however, and **shall** be made to interface with the new system, or else a new system meeting the requirements of this section **shall** be provided for the addition and the existing building alike.

      - Where the area of an addition to an existing building is equal to or less than 25 percent of the area of the existing building, the existing fire alarm system may be extended to the addition. The existing system **shall** be functional or else a new system meeting the requirements of this section **shall** be provided for the addition and the existing building.

      - Where the existing system meets the requirements of this section, it may be extended into the new addition without regard to the increased area.

   c. Where an existing building is to be renovated and there is no fire alarm system existent, an alarm system **shall** be installed to meet the requirements of this section.

2. All systems **shall** meet the requirements of the NFPA 72A (Local Protective Signaling Systems) and of NFPA 70 (National Electrical Code).

3. Fire alarm system control equipment, alarm initiating devices, power sources, municipal or remote station signaling apparatus, smoke door hold/release devices, and remote annunciation/control panels (graphic display panels excluded) **shall** be Underwriter's Laboratories listed for the installed application.

4. Equipment **shall** be provided for the selected alarm system (See Section 12.12) as follows, and **shall** function as described.

   a. A control panel **shall** be provided, incorporating all provisions for operations and capabilities described in this section.

   b. An annunciator panel, where required by the selected system, **shall** indicate the station or zone from which the alarm sequence is initiated. The annunciator panel **shall** be installed at an attended location in the school administration area (a graphic-type annunciator is recommended).

When a graphic display panel is used, the basic operation of the fire alarm system **shall not** rely upon any component or function of the graphic panel or its associated circuitry. In other words, with the graphic panel completely disconnected from the fire alarm control panel, the control panel **shall** still perform all operations required by this section.

c. An audible and visual trouble alarm **shall** be installed at an attended location in the school administration area to signal an off-normal condition of alarm initiation, or alarm and supervisory portions of the sytem. This trouble signal may be integral with the control-panel or annunciator at the discretion of the engineer.

d. A drill switch **shall** be provided to enable the administration personnel to initiate fire drills without operating an initiating device or activating the fire department notification apparatus.

e. Where manual alarm initiation stations are used, stations **shall** be installed at major exits and in accordance with NFPA 72A.

f. Audible alarm devices **shall** be provided and **shall** produce a sound level of no less than 90 decibels at 10 feet.

g. Visual alarm devices **shall** be provided and are recommended to be high-intensity lights producing no less than 8,000 candle power intensity, and **shall** be visible for 180°. White lens, with the word "FIRE" in red, is preferred. Visual alarm devices are required only where audible alarms are placed and in resource rooms accommodating deaf persons. Visual units may be individual devices, or may be an integral part of the audible alarm unit at the discretion of the engineer.

h. Where required by code or ordinance, apparatus for transmitting alarm and trouble signals **shall** be provided as applicable to operate with local alarm-reporting equipment. The engineer **shall** coordinate with the local fire authority to determine the method to be used. Leased, dedicated telephone lines may be used with the permission of the school district. Where a municipal fire-reporting circuit is available near the job site, a municipal fire-reporting box and connection to the municipal system **shall** be provided. In areas where connection to a municipal system, or direct phone line connection to a remote receiving station is not possible, radio signal communication may be utilized. Automatic telephone dialers with pretaped messages are not recommended to report the alarm condition, as they tend to tie up reporting lines excessively.

i. Emergency Power Supply: Systems **shall** be provided with an emergency power supply to insure system operation under conditions of normal power outage. The emergency power supply **shall** be capable of maintaining the system in a supervisory, standby condition for a period of at least 24 hours, with sufficient power capability after the 24-hour standby period for 15 minutes of alarm condition operation.

Emergency power may be provided from a power supply integral with the fire alarm system, or from a separate emergency power source as listed in Section 12.08, Item 3, that is compatible with the alarm system. The emergency power system **shall** be designed to automatically transfer power to the fire alarm system upon loss of normal power.

When standby batteries are used, a charger unit **shall** be provided capable of recharging the batteries within 24 hours.

j. All control switches and indicator lamps for remote operation of the system and trouble monitoring **shall** be provided and installed at an attended location in the administrative area. It is recommended that the fire alarm control panel also be located in this area and protected as much as possible from fire hazards. See Division 3, Section 3.15, for related information.

k. An automatic detection system incorporating smoke and heat detectors may be considered in lieu of manual initiating stations except that provision **shall** be made to manually activate the internal evacuation alarm at a minimum of one centrally located station.

l. All smoke detectors **shall** comply with new U.L. Standard 268 for smoke detectors; detectors not meeting this standard are not acceptable. Since the new U.L. standard requires both ionization and photoelectric detectors to meet the same response tests, the engineer shall decide the type of detectors to use.

12.12 FIRE ALARM SYSTEM OPERATION (Manual Types)

Preface: False fire alarms have long been a serious problem in a great many schools (reports indicate in up to as many as 35-45 percent of all secondary schools), and have caused much disruption to the educational process over the years. As to be expected, the problem is usually a relatively minor one in most elementary schools, less so in vocational centers, and much more severe in the middle, junior high, and high schools.

Therefore, two different types of manual fire alarm systems are permitted as described hereafter, termed Sequence "A" operation and Sequence "B" operation, and the choice of either system **shall** be optional to the school district for any type of school.

Sequence "A" is particularly recommended for secondary schools and vocational centers and is designed to discourage false fire alarms in that when an alarm box is pulled, an immediate signal is sent to the administrative area (the personnel there would then notify the local fire department at once), but the general alarm bells will not sound until administrative personnel can verify the authenticity of a fire versus a false alarm. (See more detailed description in Item 1 below.) Experience has shown that offending students lose interest in the experience when the pulling of the alarm box does not immediately set off the bells with the resulting disruption and evacuation of the building.

Sequence "B" is probably suited to most elementary schools and is the traditional system whereby the alarm bell will sound immediately upon the pulling of the alarm box.

It is suggested to the engineer and architect that a written directive be secured from the school district indicating the type of system to be designed.

1. **Sequence "A" Operation**: System **shall** be electrically supervised pre-signal type.

   The general explanation of Sequence "A" operation is as follows. The system is completely automatic and does not require positive manual operation other than pulling the alarm box. The system, however, will have a provision for short-term delay of the signal by conscious effort of a competent supervisor. When a box is pulled, a presignal is sent to an attended location in the school administration area. If no action is taken, say within 30 seconds, the alarm then sounds. If the supervisor is present, he institutes an adjustable preset delay just long enough to determine the character of the initiated alarm. If at this point no further action is initiated, the alarm would automatically sound and evacuate the building. If the supervisor determines that the alarm is false, he may cancel the alarm entirely. The time element of the delay is adjustable and **shall** be no longer than absolutely necessary. This system is recommended where false alarm problems are existing or anticipated.

   The specific Sequence "A" operation **shall** be as follows.

   a. Operation of any manual or automatic station other than fire door smoke detectors **shall**:

      - Initiate a presignal or actuate the audible alarm device at the remote annunciator (or graphic display) panel, and the visual indicator associated with the initiating device or zone. General alarm **shall not** sound.

- Start acknowledgment time delay (0-30 seconds):

  If the alarm condition is not acknowledged at the annunciator within the alarm delay period, then at the end of the delay period the general alarm signals **shall** be activated.

  If acknowledgment is made from the annunciator, investigation time delay **shall** be started (1-3 minutes) and acknowledgment time delay **shall** be reset.

  If the system has not been reset to standby operation before the preset delay times out, the general alarm evacuation signals **shall** be automatically activated. The system may be reset to standby operation any time during investigation time delay without sounding general alarm.

  For each installation, both time delays **shall** be adjusted, set, and locked to the **minimum** time required for determination of alarm condition. A timer restart/start switch **shall not** be acceptable.

b. Upon activation of any manual or automatic station, municipal or remote station alarm reporting apparatus or procedure **shall** be activated without any acknowledgment or investigative delay.

c. A manually operated switch for activation of the general alarm signals **shall** be provided to override the signal delay sequence at any time during the alarm condition.

d. Sequence "A" systems are recommended to be provided with a master selector switch which **shall** allow operation as outlined above (i.e., with time delays) or operation in any instantaneous general alarm mode (general alarm on activation of any initiation station without time delays).

2. **Sequence "B" Operation**: System **shall** be electrically supervised non-presignal type.

The general operation **shall** be as follows: The system would be completely automatic and not require positive manual operation other than pulling the alarm box. When a box is pulled, an evacuation alarm is immediately sounded and a signal sent to an attended location in the school administration area. However, there is no presignal or delay. This sequence is generally recommended where there is no record of false alarms.

The specific Sequence "B" operation **shall** be as follows.

a. Operation of any manual or automatic station other than fire door smoke detectors **shall**:

   - Activate the audible and visual indicators at the remote annunciator (or graphic display) panel indicating the initiating device or zone.
   - Activate the general alarm signals (audible and visual).
   - Activate municipal or remote station alarm-reporting procedure or apparatus.
   - The system may be "reset" to normal standby condition upon restoring the initiating device to "normal" and activating the "reset" switch on the control panel or remote annunciator panel.
   - Sequence "B" system is recommended to be provided with a master selector switch as set forth under Item 3 below.

3. **Fire Doors Operation**: Fire doors **shall** be self-closing (except as otherwise permitted by the SBC for 20-minute classroom doors).

Where it is desired to have fire doors remain open due to continual use, such as doors in stairwells, horizontal exits, building area separations, and smoke doors in corridors, it is recommended that they be held open with wall-mounted magnetic releases in combination with ceiling-mounted smoke-detectors; upon activation, smoke detector sensing particles of combustion **shall** release magnetic door holders and doors **shall** close. Manual release of doors from holding device **shall** allow self-closing with no effect upon holding device or fire alarm.

Although not mandatory, it is recommended in the interest of fire protection and best use of the equipment that the operation of the smoke detectors, fire alarms, and fire doors be set up in the following manner.

a. Sequence "A" Operation

- Smoke detector sensing **shall** close only the associated door and the general fire alarm will not sound at this time.
- Smoke detector sensing **shall** initiate a presignal alarm and subsequent Sequence "A" operation.
- The general fire alarm **shall not** release all fire doors.
- Selector switch: The selector switch recommended under Item 1, Paragraph d, preceding should on one setting provide for the above operations, and on the other setting provide during nonoccupied hours the instantaneous activation of the alarm system and the closing of all doors upon operation of any automatic or manual station. Selector switch may be manual or set on time clock for day, night, or summer operation.

b. Sequence "B" Operation

- Smoke detector sensing **shall** close only the associated door and the general alarm **shall not** sound.
- Smoke detector sensing **shall** activate the audible and visual annunciator at administrative office.
- The general alarm **will not** release all fire doors.
- Selector switch: A selector switch is recommended which on one setting will provide for the above operations, and on the other setting provide during nonoccupied hours the instantaneous activation of the alarm system and the closing of all doors upon operation of any automatic or manual station. Selector switch may be manual or set on time clock for day, night, or summer operation.

c. Door holders and associated smoke detectors **shall** be specified under the electrical divison of the plans and specifications. It is recommended that all equipment associated with fire alarm systems be furnished and installed under a single responsibility.

12.13 KITCHEN EXHAUST HOOD

1. In all kitchens where an automatic fire extinguisher system is provided for exhaust hoods, power sources **shall** be interlocked with the hood fire extinguisher system to provide automatic disconnecting of electric power supply to make-up air fans, all equipment under the hood, and all gas supply valves.

2. Exhaust air fans **shall** be maintained in operation. Exhaust fans **shall** have integral adjustable high limit cutoff set at 350°.

3. See DIVISION 11—MECHANICAL, Section 11.08, as to hood requirements and shop drawing submittal to IRM Insurance Company.

12.14 COMMUNICATION SYSTEMS

1. **Communication System**: It is recommended that the following communication systems be provided in all schools:

    a. Telephone conduit system.
    b. Classroom intercom system. All-call mode should be provided.
    c. Provisions for educational television.
    d. Program bell system.
    e. Clocks. It is recommended that secondary clocks, when provided, be the non-regulated type.

2. **Teacher Distress Call System**: May be provided at the option of the school district.

3. **Instrusion Detection System**: May be provided at the option of the school district.

4. Additional systems may be provided at the discretion of the school district and the engineer.

12.15 PROVISIONS FOR EDUCATIONAL TELEVISION

1. See DIVISION 15—REFERENCES for suggested specifications and details as approved by the South Carolina Educational Television Network for the layout and design of ETV systems.

2. All new buildings and new building additions **shall** be provided with a raceway system for a complete ETV system, whether the wiring and the remainder of the system is to be included at the time of construction or not.

3. Although not mandatory, it is recommended that the entire ETV system (excluding TV sets and VTR equipment) be included under the electrical engineer's jurisdiction and, in turn, a part of the overall electrical contract. The district should be consulted prior to a decision in this matter, however.

4. The electrical engineer should contact the Field Technical Services Advisor at the South Carolina ETV Center, 2717 Millwood Avenue, Columbia, South Carolina (mailing address: Drawer L, Columbia, SC 29250) at the design development stage to coordinate requirements and system concepts for the project.

12.16 PROVISIONS FOR TEACHING EQUIPMENT

1. Raceways, enclosures, power sources, and electrical equipment required for teaching aids or equipment in areas such as science, home economics, business classrooms, media centers, language laboratories, shops, etc., **shall** be provided.

2. Consideration should be given to future load growth, both in systems capacity and in physical accessibility for expansion.

12.17 LIGHTNING PROTECTION

1. Lightning protection systems may be provided at the discretion of the school district and the engineer. Where complete systems are provided, the U.L. Master Label requirements **shall** be used for design and construction and the Master Label inspection service **shall** be required. At job completion, the Master Label plate **shall** be affixed to the building.

12.18 ENERGY CONSERVATION

1. The engineer **shall** make every effort to provide a system designed with the maximum utilization of energy conservation measures consistent with the functional requirements of the building. Lighting levels should be kept as low as reasonably needed and light sources should produce the lowest possible watts/square foot consistent with visual task requirements and aesthetic constraints.

2. There **shall** be close coordination between the electrical and mechanical engineers and the architect in the interest of energy conservation.

   See Section 11.10 for recommended life cycle cost analysis involving both electrical and mechanical systems.

12.19 RECORD DRAWINGS

1. The electrical engineer **shall** specify that during construction operations the electrical contractor **shall** faithfully make a record of all approved changes from the contract drawings, including accurate dimensions where applicable, and **shall** also record accurate dimensions locating all below-grade outside electrical utilities (whether changed or not) with reference to permanent above-grade objects.

2. The engineer **shall** also specify that at completion of the work all such changes **shall** be recorded neatly with red ink by the electrical contractor on an unused set of the electrical contract drawings supplied by the architect. The red line changes **shall** be reviewed by the engineer and the completed record prints returned to the architect.

3. See Sections 7.05 and 9.09 for related record drawing requirements.

12.20 ENGINEER'S DECLARATION AT COMPLETION

1. At project completion, the architect **shall** submit to the OSP&B a single form (see DIVISION 13—SAMPLE FORMS) which **shall** be signed by the architect and the plumbing, mechanical, and electrical engineers as to the following declaration:

   > This is to declare that the work done for which my firm bears the design responsibility has been reviewed by me or my representative and is, to the best of my knowledge and belief, installed substantially in accordance with the plans and specifications as approved by the Office of School Planning and Building. The installation meets with my approval and acceptance is recommended.

13.01 INDEX OF FORMS INCLUDED IN THIS DIVISION

Form Number	Title	Page	Referenced From
F1	Request for Waiver from Use of Professional Services	13-2	Division 1
F2	Application for Approval of Property Acquisition	13-4	Division 2
F3	S. C. Board for Barrier-Free Design—Waiver Request or Appeal Form	13-5	Division 4
F4	Request for Plan Review by Department of Education Consultants	13-7	Division 6
F5	Building Code Analysis Form	13-8	Divisions 6, 7
F6	Application for Approval of Final Construction Documents	13-10	Division 7
F7	Square Foot Cost Information	13-11	Division 8
F8	Architects'/Engineers' Declaration at Completion	13-13	Divisions 9, 10, 11, 12
F9	Preliminary Information Form	13-14	Division 6

NOTE: ALL FORMS MAY BE REPRODUCED

FORM **F1**

REQUEST FOR WAIVER FROM USE OF PROFESSIONAL SERVICES

SUBMIT TWO COPIES OF THIS FORM TO DIRECTOR OFFICE OF SCHOOL PLANNING AND BUILDING

TO: DIRECTOR, OFFICE OF SCHOOL PLANNING AND BUILDING
SOUTH CAROLINA DEPARTMENT OF EDUCATION

DATE: ____________

FROM: SUPERINTENDENT ____________ COUNTY ____________ DISTRICT ____________

It is hereby requested that a waiver be granted from the requirements of Section 1.06 of the *South Carolina School Facilities Planning & Construction Guide* concerning the use of professional architectural and/or engineering services for the following project of a very small nature.

LOCATION OF PROJECT: ____________

DESCRIPTION OF PROJECT: ____________

SOURCE OF PLANS AND SPECIFICATIONS: ____________
(Attach any plans and specifications with this form)

INSPECTION OF CONSTRUCTION TO BE DONE BY: ____________

Area, Square Feet	____________	Local Funds	$ ____________
Estimated Cost per Sq. Ft.	$ ____________	State Building Funds	$ ____________
Total Estimated Cost of Project	$ ____________	Other State Funds	$ ____________
Above Estimate by ____________		Federal Funds	$ ____________

If this waiver is granted, the Board of Trustees of the above-named school district hereby agrees to accept all responsibility concerning adherence in the design of the project to applicable codes, laws, and regulations and also responsibility for final completion of the project so that all codes, laws, and regulations are complied with.

____________ Date ____________
District Board Chairman

____________ Date ____________
District Superintendent

(Reverse side is for Office of School Planning and Building response)

REVISED

P 13-2

SDE 45-011-00

(This side is for Office of School Planning and Building response)

TO: ______________________________ DISTRICT SUPERINTENDENT

DISTRICT: ____________________ COUNTY: __________________________

FROM: _________________________ DIRECTOR, OFFICE OF SCHOOL PLANNING AND BUILDING

Concerning your request on the reverse side of this form for waiver from the use of professional services for the described project:

WAIVER GRANTED ( )

Remarks: ____

WAIVER NOT GRANTED ( )

Remarks: ____

______________________________________ Date____________
Director
Office of School Planning and Building

REVISED

P 13-3

FORM **F2**

APPLICATION FOR APPROVAL OF PROPERTY ACQUISITION

SUBMIT TWO COPIES OF THIS FORM ALONG WITH PLAT OF PROPERTY TO DIRECTOR, OFFICE OF SCHOOL PLANNING AND BUILDING

COUNTY __________ DISTRICT __________ DATE __________

DISTRICT SUPERINTENDENT __________ GRADES INCLUDED __________

SCHOOL TYPE: Elementary ____ Middle ____ Jr. High ____ High ____ Vocational ____

Or, if property is for other purpose __________

SCHOOL ENROLLMENT: Initial Capacity __________ Projected Expansion __________

NUMBER OF ACRES __________ COST PER ACRE $ __________ TOTAL COST $ __________

LOCATION AND DESCRIPTION OF SITE: __________

ACCESSIBILITY: __________

TOPOGRAPHY: __________

SOURCE OF FIRE PROTECTION: __________

CHECK UTILITIES AVAILABLE:

Gas ____ Electricity ____ Telephone ____

Water (Describe Source) __________

Sewage Disposal (Describe) __________

WILL THE PROPERTY HAVE FEE SIMPLE TITLE? __________

GENERAL REMARKS: __________

OBSERVED BY:

__________ Date ____
Office of School Planning and Building

REQUESTED BY:

__________ Date ____
District Board Chairman

APPROVED BY:

__________ Date ____
Director
Office of School Planning and Building

__________ Date ____
District Superintendent

Office of School Planning and Building Site No. ____

REVISED

P 13-4

FORM **F3**

S. C. BOARD FOR BARRIER-FREE DESIGN—WAIVER REQUEST OR APPEAL FORM

SECTION I OF THIS FORM IS TO BE USED WHEN A SCHOOL DISTRICT, ARCHITECT, OR ENGINEER WISHES TO REQUEST A WAIVER FROM THE S. C. BARRIER-FREE DESIGN STANDARDS. SEND TWO COPIES OF SECTION 1 TO THE OFFICE OF SCHOOL PLANNING AND BUILDING.

SECTION II IS FOR THE USE OF THE OFFICE OF SCHOOL PLANNING AND BUILDING IN CASE A DISTRICT, ARCHITECT, OR ENGINEER WISHES AN APPEAL SENT TO THE S. C. BOARD FOR BARRIER-FREE DESIGN IN INSTANCES WHERE THE OFFICE OF SCHOOL PLANNING AND BUILDING HAS DENIED A REQUEST FOR WAIVER.

SECTION I (To be completed by the district, or the architect or engineer.)

SCHOOL DISTRICT ______________________ DATE ______________

ADDRESS ______________________ PHONE ______________

CATEGORY OF BUILDING AND DESCRIPTION: New Construction ( ) Renovation ( )

1. Give the section of the S. C. Barrier-Free Design Standard from which you are requesting a waiver and the reasons for this request. Use continuation sheets if needed and attach plans, drawings, and other information if appropriate and necessary to support or describe your request. If yours is a renovation project, please refer to S. C. Barrier-Free Design Standard, Section 19-400.2, and provide information needed for the Office of School Planning and Building to determine if 35 percent is structurally affected or changed.
2. Estimate of total project construction/renovation cost. $ __________
3. Estimate of projected cost of compliance with Barrier-Free Design Standard. Attach itemized cost of compliance calculation sheet. $ __________
4. Cost of compliance as a percent of total project construction cost. __________ %

CERTIFICATION (To be completed by the architect; or if none, the engineer; or if neither, then the school district.)

I certify as valid all data submitted, and reasonable and proper the proposal for waiver or modification of the standards as required by Section 10-5-270 of the *Code of Laws of South Carolina, 1976*, as amended.

Name ______________________ Telephone ______________

By (Signature) ______________________ Reg. No. ______________

Address ______________________________________

List of Attachments:

(Part II is on reverse side)

REVISED P 13-5

SDE 45-013-00

SECTION II (To be completed by a representative of the Director, Office of School Planning and Building upon request of a district, or the architect or engineer whose request for waiver has been denied.)

REPORT OF DENIAL OF REQUEST FOR WAIVER BY DIRECTOR, OFFICE OF SCHOOL PLANNING AND BUILDING

1. Date of denial of request:
2. Date of on-site visit if one was conducted:
3. Dates of owner, architect, or engineer conferences, if any:
4. Give the section of the S. C. Barrier-Free Design Standard from which a request for waiver was made and the basis and rationale for denial of the request. Please be as specific as possible. Pertinent portions of minutes of procedures or other documents may be attached for explanation.

I certify that I am authorized to speak for the Director, Office of School Planning and Building, and that the information provided above is accurate.

Name____

By (Signature)____________________________________

Title______________________________ Date______________

List of Attachments:

FORM **F4**	REQUEST FOR PLAN REVIEW BY DEPARTMENT OF EDUCATION CONSULTANTS

IF PLAN REVIEW BY DEPARTMENT OF EDUCATION CONSULTANTS IS DESIRED, SUBMIT ONE COPY OF THIS FORM TO DIRECTOR, OFFICE OF SCHOOL PLANNING AND BUILDING, ALONG WITH SCHEMATIC AND/OR DESIGN DEVELOPMENT PLAN SUBMITTALS

TO: DIRECTOR, OFFICE OF SCHOOL PLANNING AND BUILDING DATE__________
SOUTH CAROLINA DEPARTMENT OF EDUCATION

FROM: SUPERINTENDENT__________ COUNTY__________ DISTRICT__________

NAME OF PROJECT____________________

ARCHITECTURAL FIRM____________________

TYPE SUBMITTAL: Schematic ( ) Design Development ( )

Plan reviews by Department of Education Consultants are requested as follows (it is understood that use of these consultants will not appreciably lengthen the overall time of review).

1. ☐ Request all applicable consultants to review.

2. Do not wish all consultants to review, but request reviews by the following individual consultants.

- ☐ Elementary Supervisor
- ☐ Secondary Supervisor
- ☐ Kindergarten
- ☐ Special Education
- ☐ Media Center
- ☐ Food Service
- ☐ PE and Athletics
- ☐ Science
- ☐ Art
- ☐ Music

Vocational as follows:

- ☐ Business Education
- ☐ Home Economics
- ☐ Home Economics Occupational
- ☐ Health Occupations
- ☐ Marketing and Distributive Education
- ☐ Agriculture
- ☐ Industrial Arts
- ☐ Prevocational Education
- ☐ Trades and Industry (Masonry, Carpentry, Auto Mechanics, etc.)
- ☐ Other

Signed____________________ Date__________
District Superintendent

cc: Architect

FORM **F5** BUILDING CODE ANALYSIS FORM

THIS FORM MAY BE USED FOR EACH OF THE PLAN SUBMITTAL PHASES—SCHEMATIC (OPTIONAL), DESIGN DEVELOPMENT AND CONSTRUCTION DOCUMENTS. IT IS RECOMMEND THAT THE DATA FOR THE "STRUCTURAL MEMBERS" AND "SEPARATION WALLS" PARTS BE INCLUDED AS PART OF THE DESIGN DEVELOPMENT SUBMITTAL, BUT IT IS NOT MANDATORY. BUT IF NOT SUBMITTED THEN, IT IS URGENT THAT IT BE SUBMITTED TO OSP&B FOR PRIOR APPROVAL IN THE EARLY STAGES OF THE FINAL PLANS.

PROJECT ______________________ DISTRICT ______________________

DATE __________ SUBMITTAL: Schematic ( ); Design Development ( ); Construction Document ( )

SBC EDITION: ______________

			DESIGNATED AREAS OF BUILDING (Indicate on floor plan.)				
CODE ITEM		CODE REFERENCE	1	2	3	4	5
Occupancy Classification		Chapter IV					
Construction Classification		Chapter VI					
Height 1 lin. ft.	Allowed	Chapter IV Table 400					
	Actual						
Area sq. ft.	Allowed	"					
	Actual						
STRUCTURAL MEMBERS		Chapter VI Table 600	(Insert appropriate hourly ratings and/or test numbers.)				
Exterior Bearing Walls		"					
Exterior Nonbearing Walls		"					
Interior Bearing Walls		1 Fl. Plus					
		1 Fl. Only					
		Roof Only					
Columns		1 Fl. Plus					
		1 Fl. Only					
		Roof Only					
Beams, Girders		1 Fl. Plus					
		1 Fl. Only					
		Roof Only					
Floor Construction		Table 600					
Roof Construction		"					
SEPARATION WALLS		Chapter VII Table 700	(Insert appropriate hourly ratings and/or test numbers.)				
Fire Walls		Section 402					
Occupancy Separation		Section 403					
Exit Stair		Section 1106					
Horizontal Exit		Section 1117					
Exit Outlet		Section 1112					
Exit Access		Section 702					
Elevator and Shaft		Section 701					
Interior Partitions		Section 702					

REVISED USE REVERSE SIDE FOR AREA AND HEIGHT CALCULATIONS P 13-8

SDE 45-015-00

FOR HEIGHT MODIFICATION: Refer to SBC Section 402.2 and Table 400.

FOR AREA MODIFICATION: Refer to SBC Section 402.3 and Table 400.

Area modification factors are applicable to those types of construction classification where the allowable area is a basic limited square footage. The table below has been derived from the area modification formula in SBC Section 402.3.

$$I = 4/3 \quad 100\% \; (F/P - 0.25)$$

I = percent increase of unsprinkled areas
F = open perimeter in lin. ft. which has horizontal separation of 30'
P = total perimeter of building in lin. ft.
F/P = percentage of perimeter which has 30' horizontally clear

The applicable percentage of area increase derives directly from the amount of "open" perimeter of any particular area and this percentage figure can be taken directly from the table without the necessity of actually applying the formula itself.

TABLE:

Percentage of Open Perimeter	Allowable Percentage Increase	Percentage of Open Perimeter	Allowable Percentage Increase	Percentage of Open Perimeter	Allowable Percentage Increase	Percentage of Open Perimeter	Allowable Percentage Increase
25	0*	44	25.3	63	50.7	82	76.0
26	1.3	45	26.7	64	52.0	83	77.3
27	2.7	46	28.0	65	53.3	84	78.7
28	4.0	47	29.3	66	54.7	85	80.0
29	5.3	48	30.7	67	56.0	86	81.3
30	6.7	49	32.0	68	57.3	87	82.7
31	8.0	50	33.3	69	58.7	88	84.0
32	9.3	51	34.7	70	60.0	89	85.3
33	10.7	52	36.0	71	61.3	90	86.7
34	12.0	53	37.3	72	62.7	91	88.0
35	13.3	54	38.7	73	64.0	92	89.3
36	14.7	55	40.0	74	65.3	93	90.7
37	16.0	56	41.3	75	66.6	94	92.0
38	17.3	57	42.7	76	68.0	95	93.3
39	18.7	58	44.0	77	69.3	96	94.7
40	20.0	59	45.3	78	70.7	97	96.0
41	21.3	60	46.7	79	72.0	98	97.3
42	22.7	61	48.0	80	73.3	99	98.7
43	24.0	62	49.3	81	74.7	100	100.0

*NO INCREASE ALLOWED FOR 25 PERCENT OR LESS.

AREA CALCULATIONS: Insert appropriate figures

Area **	Basic Area Allowed	Open L/F Perimeter	Total L/F Perimeter	Percentage Open Perimeter	Percentage Area Increase	Sq. Ft. Area Increase	Total Area Allowed
1							
2							
3							
4							
5							

**THE LOCATIONS OF THE DIFFERENT AREAS MUST BE SHOWN ON THE DESIGN DEVELOPMENT PLANS

GENERAL NOTES: IN CODE ANALYSIS, IT IS RECOMMENDED THAT THE ARCHITECT CONSULT THE PREFACE OF THE SOUTHERN BUILDING CODE FOR "RECOMMENDED PROCEDURES TO FOLLOW IN THE USE OF THE STANDARD BUILDING CODE." ALSO, THE ARCHITECT IS REMINDED THAT THE SOUTHERN BUILDING CODE CONGRESS HAS AVAILABLE WORK SHEETS AND CHECKLISTS FOR CODE ANALYSIS AND ALSO THAT THEIR CODE ANALYSIS FORMS MAY BE USED IN LIEU OF THIS FORM.

FORM **F6**

APPLICATION FOR APPROVAL OF FINAL CONSTRUCTION DOCUMENTS

SUBMIT ONE COPY OF THIS FORM TO DIRECTOR OFFICE OF SCHOOL PLANNING AND BUILDING, ALONG WITH FINAL CONSTRUCTION DOCUMENTS FOR REVIEW

NAME OF PROJECT__________ DATE__________

COUNTY__________ DISTRICT______ SUPERINTENDENT__________

SCHOOL ENROLLMENT: Initial Capacity__________ Projected Expansion__________

ESTIMATED COST OF PROJECT UNDER THIS CONTRACT(S):

Area of building(s) in total equivalent square feet__________sq. ft.
(See Form F7 for method of determining square footage.)

Estimated cost per sq. ft. $__________

Total estimated cost $__________

ESTIMATED SOURCES OF FUNDING:

Local Funds $__________

State School Building Funds $__________

Other State Funds (describe) $__________ __________

Federal Funds (describe) $__________ __________

Total $__________

THE FOLLOWING ENGINEERS HAVE PREPARED THE RESPECTIVE PORTIONS OF THE WORK:

Structural__________ Mechanical__________

Plumbing__________ Electrical__________

The undersigned certifies that the final construction documents for the above project are to the best of my knowledge in accordance with the requirements of the current *South Carolina School Facilities Planning & Construction Guide.*

Architectural/Engineering Firm__________ Date__________

By__________ Title__________ License No.__________

The undersigned certify that the final construction documents for the above project have been approved by the Board of Trustees of this district.

District Board Chairman__________ Date__________

District Superintendent__________ Date__________

FORM **F7** SQUARE FOOT COST INFORMATION

SUBMIT ONE COPY OF THIS FORM TO OFFICE OF SCHOOL PLANNING AND BUILDING. THIS IS REQUIRED FOR ALL NEW BUILDINGS, BUT IS NOT MANDATED FOR ADDITION OR RENOVATION PROJECTS.

PROJECT__________ BID DATE__________

COUNTY__________ DISTRICT__________ ARCHITECT__________

PUPIL ENROLLMENT DATA: Building as Designed__________ Estimated Ultimate Growth__________

Indicate any core areas that have been designed large enough to accommodate the ultimate anticipated growth: Administrative Area ( ); Media Center ( ); Cafeteria ( ); Kitchen ( ); PE/Athletic ( ); Other__________

DESCRIPTIVE BUILDING DATA: Single-Story ( ) Multistory ( )

Floor System:

Structural System:

Exterior and Interior Walls:

Roof System:

HVAC System:

Other:

SQUARE FOOT COMPILATION:

	Actual Sq. Ft. Area	Proportional Factor	Equivalent Sq. Ft. Area
Enclosed Area*			
Covered Open Area (walkways, etc.)**	________	@ 1 = *	________
Existing Areas Renovated (if any)	________	@ ½ = **	________
Other	________	@ = ***	________
	________	@ = ***	________

Total Equivalent Square Footage ________

* INCLUDE THE AREA OF ALL FLOORS, BASEMENTS AND MEZZANINES. ALSO LIST GYMNASIUMS, AUDITORIUMS, SHOPS, AND OTHER HIGH-CEILING SPACES AT ACTUAL FLOOR AREA AND STILL USE PROPORTIONAL FACTOR OF "1"

** DO **NOT** INCLUDE ANY ROOF OVERHANGS OR UNCOVERED WALKS, TERRACE, STEPS

***MAKE YOUR OWN ESTIMATE OF THE "PROPORTIONAL FACTOR"

(See reverse side for cost information.)

REVISED

SDE 45-017-00

CONTRACT(S) INFORMATION:

1. All Prime Contracts		Amount
______	$	______
______		______
______		______
______		______
______		______
______		______
______		______
______		______
______		______
______		______
______		______
______		______
______		______
______		______
______		______
______		______
______		______
Total Cost of All Contracts Under Architect	$	______

2. Sitework Costs Included in #1 Above

Storm Drainage	$	______
Clearing		______
Grading		______
Paving		______
Walks		______
Landscaping		______
Stadium, Track		______
Fencing, etc.		______
______		______
Total Sitework Cost	$	______

3. Equipment and Furnishings Costs Included in #1 Above

Kitchen Equipment	$	______
Science Equipment		______
Library Equipment		______
Lockers		______
Gym Seating		______
Auditorium Seating		______
PE/Athletic		______
Sewage Treatment Plant		______
______		______
______		______
______		______
Total Equipment/ Furnishings Cost	$	______

SQUARE FOOT COST INFORMATION

4. Total Equivalent Square Footage (See other side) ______ s/f

5. Total of All Prime Contracts (See #1)* $______

6. Sitework Costs (See #2) $______

7. Equipment/Furnishings Costs (See #3) $______

8. Basic Building Cost (5–[6 + 7])** $______

9. Plumbing Contract $______

10. HVAC Contract $______

11. Electrical Contract $______

SUMMARY:

TOTAL SQ. FT. COST (5 ÷ 4)* $______

BASIC BUILDING SQ. FT. COST (8 ÷ 4)** $______

PLUMBING SQ. FT. COST (9 ÷ 4) $______

HVAC SQ. FT. COST (10 ÷ 4) $______

ELECTRICAL SQ. FT. COST (11 ÷ 4) $______

* "TOTAL COST" INCLUDES ALL CONTRACTS UNDER THE ARCHITECT'S JURISDICTION. IT DOES NOT INCLUDE CONTRACTS LET SEPARATELY BY THE SCHOOL DISTRICT, NOR DOES IT INCLUDE LAND COSTS OR A/E OR CONSTRUCTION MANAGEMENT FEES.

** "BASIC BUILDING COST" IS THE TOTAL COST WITH THE ITEMS THAT ARE VARIABLE FROM ONE PROJECT TO ANOTHER DEDUCTED, SUCH AS SITEWORK, WHICH VARIES CONSIDERABLY DUE TO TERRAIN AND OTHER FACTORS, AS WELL AS EQUIPMENT AND FURNITURE COSTS THAT MAY BE INCLUDED IN ONE PROJECT BUT NOT IN ANOTHER. BASIC BUILDING SQUARE FOOT COST IS A MORE EQUITABLE WAY OF COMPARING THE ACTUAL COST OF ONE BUILDING TO ANOTHER.

REVISED

FORM F8 ARCHITECTS'/ENGINEERS' DECLARATION AT COMPLETION

(PREPARE THIS FORM IN DUPLICATE WITH ALL SIGNATURES AND FORWARD THE ORIGINAL TO THE OFFICE OF SCHOOL PLANNING AND BUILDING SEND A COPY TO THE DISTRICT SUPERINTENDENT.)

TO: The Office of School Planning and Building

RE: Job ____________________

County ____________ District ____________

"This is to declare that the work done for which my firm bears the design responsibility has been reviewed by me or my representative and is to the best of my knowledge and belief installed substantially in accordance with the plans and specifications as approved by the Office of School Planning and Building. The installation meets with my approval and acceptance is recommended."

ARCHITECT: FIRM ____________________

Date ____________ Signature of Principal ____________________

Remarks ____________________

PLUMBING ENGINEER: FIRM ____________________

Date ____________ Signature of Principal ____________________

Remarks ____________________

MECHANICAL ENGINEER: FIRM ____________________

Date ____________ Signature of Principal ____________________

Remarks ____________________

ELECTRICAL ENGINEER: FIRM ____________________

Date ____________ Signature of Principal ____________________

Remarks ____________________

cc: District Superintendent

FORM **F9**

PRELIMINARY INFORMATION FORM

SUBMIT ONE COPY OF THIS FORM TO DIRECTOR, OFFICE OF SCHOOL PLANNING AND BUILDING, ALONG WITH SCHEMATIC OR DESIGN DEVELOPMENT PLAN SUBMITTALS, WHICHEVER IS FIRST SENT

GENERAL INFORMATION

DATE ______

PROJECT NAME ______

COUNTY ______ DISTRICT ______

SUPERINTENDENT ______

ARCHITECT ______

PLAN SUBMITTAL
- Schematic ( )
- Design Development ( )

PROJECT TYPE
- Elementary ( )
- Middle ( )
- Junior High ( )
- Senior High ( )
- Vocational ( )
- Other ______

PROJECT DESCRIPTION
- All New Construction ( )
- Addition to Existing Building ( )
- Alterations or Renovations ( )

If existing building(s) involved, date(s) of construction ______

GRADE LEVEL OF SCHOOL ______

ENROLLMENT DATA
- Building as Designed ______
- Estimated Ultimate Size ______

LIST ANY CORE AREAS DESIGNED LARGE ENOUGH TO ACCOMMODATE THE ESTIMATED ULTIMATE SIZE (SUCH AS ADMINISTRATION, MEDIA CENTER, CAFETERIA, ETC.)

______ ______ ______

______ ______ ______

______ ______ ______

SQUARE FOOT AREAS
- 1st Floor ______
- 2nd Floor ______
- Other ______
- Total ______

ESTIMATED COST PER SQ. FT. $ ______

TOTAL ESTIMATED PROJECT COST $ ______

REMARKS

SITE INFORMATION

SITE SIZE/ACRES ______

DATE OF SITE APPROVAL BY OSP&B ______

INDICATE AVAILABLE UTILITIES

Electricity ____ Gas ____ Telephone ____

Water (DESCRIBE SOURCE)

______

______

Sewage Disposal (DESCRIBE)

______

______

ESTIMATED MEANS OF STUDENT TRANSPORTATION
- Bus ____ %
- Parents ____ %
- Students' Cars ____ %
- Bicycle ____ %
- Walk ____ %

NUMBER OF PARKING SPACES REQUIRED
- Physically Handicapped ______
- Visitors ______
- Administrative/ Faculty ______
- Students' Cars ______
- Kitchen Employees ______
- Custodians ______

RELATIVE TO PARENTS' PICK-UP OF STUDENTS AFTER SCHOOL, HOW MANY CARS SHOULD BE ALLOWED FOR IN STACK-UP LANE? ______.

WILL BUSES BE PARKED ON SITE? ____ IF YES, GIVE NUMBER OF FULL-SIZED BUSES ____; NUMBER OF MINI-BUSES ____.

NOTE: Site facilities for PE/Athletics are to be listed under that section.

REMARKS

REVISED

SDE 45-019-00

ADMINISTRATION

NUMBER OF ASSISTANT PRINCIPALS ____

PERSONNEL IN ADMINISTRATIVE SUITE:
(IN ADDITION TO PRINCIPAL OR ASSISTANT PRINCIPAL)

Secretaries ____
Bookkeeper ____
Other ____ ____
Other ____ ____
Other ____ ____

REMARKS

GUIDANCE

ELEMENTARY SCHOOL
SECONDARY SCHOOL

Is space provided for guidance counselors? ____

Number of counselors that are required ____

Will future growth dictate additional counselors? ____

REMARKS

KINDERGARTEN

TYPE OF KINDERGARTEN UNITS
Single-Session ( )
Double-Session ( )

WILL KINDERGARTEN STUDENTS EAT IN CAFETERIA? ____

IS IT LIKELY THAT FUTURE GROWTH WILL DICTATE ADDITIONAL KINDERGARTEN UNITS? ____

REMARKS

GENERAL CLASSROOMS

ELEMENTARY SCHOOL — Number of Classrooms for Each Grade

1st Grade ____ 4th Grade ____
2nd Grade ____ 5th Grade ____
3rd Grade ____ 6th Grade ____

SECONDARY SCHOOL — Number of General Classrooms ____

REMARKS

SPECIAL EDUCATION

SEE SECTION 3.09 FOR HANDICAPPING ABBREVIATIONS

TOTAL NUMBER OF SELF-CONTAINED CLASSROOMS ____

Indicate below the number of classrooms devoted **exclusively** to the handicapping conditions shown (i.e., no "commingling").

EMH ____ PMH ____ LD ____ VH ____
TMH ____ EH ____ HH ____ OH ____

Indicate below the number of classrooms which will serve **more** than one handicapping condition.

NO. OF CR's	NOTE VARIOUS CONDITIONS SERVED			

TOTAL NUMBER OF RESOURCE ROOMS ____

Indicate below the number of classrooms devoted **exclusively** to the handicapping conditions shown (i.e., no "commingling").

EMH ____ LD ____ VH ____
EH ____ HH ____ OH ____

Indicate below the number of classrooms which will serve **more** than one handicapping condition.

NO. OF CR's	NOTE VARIOUS CONDITIONS SERVED			

TOTAL NUMBER OF ITINERANT PROGRAMS ____

Indicate below the number of classrooms devoted **exclusively** to the handicapping conditions shown (i.e., no "commingling").

EMH ____ LD ____ VH ____ OH ____
EH ____ HH ____ Speech/Language ____
Psychological Testing and Vision/Hearing Screening ____

Indicate below the number of classrooms which will serve **more** than one handicapping condition.

NO. OF CR's	NOTE VARIOUS CONDITIONS SERVED			

REMARKS

REVISED

MUSIC

ELEMENTARY SCHOOL

MUSIC TO BE TAUGHT IN:
Separate Music Room ( )
General Classroom ( )
Other ____________

MUSIC TO BE TAUGHT BY:
Full-time Music Teacher ( )
Classroom Teacher ( )
Itinerate Music Teacher ( )
Other ____________

DESCRIBE PROGRAM

SECONDARY SCHOOL

BAND/ORCHESTRA LOCATED IN:
Band/Orchestra Room ( )
Other ____________

CHORAL/VOCAL LOCATED IN:
Choral/Vocal Room ( )
Other ____________

MAXIMUM NUMBER TO BE ACCOMMODATED
Band ____________
Orchestra ____________
Vocal ____________

BAND/ORCHESTRA FLOOR: Flat ( ) Tiered ( )
VOCAL FACILITIES FLOOR: Flat ( ) Tiered ( )
Or Vocal will use folding risers ( )

DO YOU ANTICIPATE COMMUNITY USE OF THE MUSIC FACILITY? ____________
____

WILL RESTROOMS BE AVAILABLE FOR AFTER-HOURS USE BY BAND/VOCAL STUDENTS? ____________

CHECK IF THE FOLLOWING WILL BE PROVIDED

Office(s)	( )	Library	( )
Instrument Storage	( )	Uniform Storage	( )
Instrument Repair	( )	Robe Storage	( )
Practice Rooms	( )	Drinking Water	( )
Ensemble Rehearsal Room	( )		

WILL THE BAND HAVE A SUITABLE OUTSIDE PRACTICE AREA? ____________

DESCRIBE PROGRAM

MEDIA CENTER

NUMBER OF VOLUMES TO BE HOUSED
Building as Designed ____________
Are you allowing for future growth? ________ If so, how many volumes? ____________

NUMBER OF STUDENTS TO SEATED
At Tables ____________
At Carrells ____________
Lounge Furniture ____________
Other ____________

IS THE READING ROOM SIZED TO ACCOMMODATE ANY ESTIMATED ULTIMATE GROWTH? ________

IS VIDEO TAPE RECORDING CAPABILITY TO BE INCLUDED? ____________

REMARKS

ART

ART TO BE TAUGHT IN
Separate Art Room ( )
General Classroom ( )
Other ____________

ART TO BE TAUGHT BY:
Full-time Art Teacher ( )
Classroom Teacher ( )
Itinerant Art Teacher ( )
Other ____________

IF SEPARATE ART ROOM, WILL IT BE SHARED WITH OTHER CURRICULA? ________ If YES, DESCRIBE ____________

DO YOU ANTICIPATE COMMUNITY USE OF THE ART FACILITY? ____________
____

WILL OUTSIDE ART FACILITIES BE PROVIDED?
____

REMARKS

P/E ATHLETICS

ELEMENTARY SCHOOL

WILL THERE BE AN INDOOR FACILITY? Yes ( )
(SUCH AS MULTIPURPOSE ROOM OR GYM) No ( )

NAME SPECIAL OUTDOOR FACILITIES
(SUCH AS HARD SURFACE AREAS, ACTIVITY FIELD, ETC.)

____________ ____________
____________ ____________

DO YOU ANTICIPATE COMMUNITY USE OF AN INDOOR FACILITY? Yes ( ) No ( )

DESCRIBE PROGRAM

SECONDARY SCHOOL

GYMNASIUM	Number of Spectator Seats	____
	Size of Basketball Court	____ x ____
	Number of Cross Courts	____
	Floor marked for what other games or activities?	____________ ____________

DRESSING ROOMS (STUDENT CAPACITY)		Maximum Number at One Time
	Boys' PE	____
	Girls' PE	____
	Varsity Football	____
	JV Football	____
	Other Boys' Varsity	____
	Girls' Varsity	____
	Other	

ARE THE DRESSING ROOMS SIZED FOR ANY ESTIMATED GROWTH FACTOR? Yes ( ) No ( )

NUMBER OF PE TEACHERS Men ____ Women ____

NUMBER OF COACHES (include AD) Men ____ Women ____

NAME COMPETITIVE SPORTS:

Boys ____________	Girls ____________
____________	____________
____________	____________
____________	____________
____________	____________
____________	____________

DO YOU ANTICIPATE COMMUNITY USE OF THE GYMNASIUM? ____________ OR OF THE DRESSING ROOMS? ____________

(PE/ATHLETICS CONTINUED)

REMARKS ABOUT PROGRAM OR INTERIOR FACILITIES

CHECK SITE FACILITIES TO BE PROVIDED	Football Stadium	____
	Running Track	____
	Practice Football Field	____
	Baseball Field	____
	Softball Field	____
	Soccer Field	____
	Tennis	____
	Band Practice Area	____
	Public Concessions	____
	Public Toilets	____
	Other ____________	

IF A FOOTBALL STADIUM IS TO BE ON SITE, WILL A FIELD HOUSE BE PROVIDED FOR DRESSING? ____________ OR WILL THE VISITING AND HOME TEAMS UTILIZE THE GYM DRESSING ROOMS?
____

DO YOU ANTICIPATE ANY ORGANIZED COMMUNITY USE OF THE SITE FACILITIES?
____

REMARKS

SCIENCE

INDICATE COURSE OFFERINGS

NUMBER OF SECTIONS

( ) 5th Grade Departmentalized Science ______
( ) 6th Grade Departmentalized Science ______
( ) 7th Grade General Science ______
( ) 7th Grade Life Science ______
( ) 8th Grade General Science ______
( ) 8th Grade Earth Science ______
( ) 9th Grade Physical Science ______
( ) 9th Grade General Science ______
( ) Biology I______ ( ) Chemistry I ______
( ) Biology II______ ( ) Chemistry II ______
( ) Physics ______
( ) Other (SUCH AS HONORS PROGRAM, ASTRONOMY, MARINE SCIENCE, ENVIRONMENTAL EDUCATION, ETC.)

____________ ______ ____________ ______
____________ ______ ____________ ______
____________ ______ ____________ ______

WILL STUDENTS BE CONDUCTING INDIVIDUAL RESEARCH PROJECTS? ______________

WILL ALL THE SCIENCE ROOMS BE COMBINED LAB/LECTURE TYPE ROOMS (whether "island" or perimeter-type lab layout)? ______________
IF NO, PLEASE INDICATE EXCEPTIONS BELOW.

INDICATE UTILITIES INCLUDED IN LAB/LECTURE ROOMS

	Cold Water	( )	Electricity	( )
	Hot Water	( )	Gas	( )

TYPE OF GAS Natural ( ) Propane ( )

WILL A GREENHOUSE BE INCLUDED? ______________

REMARKS

CAFETERIA

ESTIMATED PERCENTAGE OF ENROLLED STUDENTS THAT WILL EAT LUNCH IN THE CAFETERIA ______________%.

THIS TRANSLATES INTO __ (NUMBER) STUDENTS.

WHAT IS THE MAXIMUM NUMBER TO BE SEATED AT LUNCH AT ANY ONE SITTING: ______________

IS CAFETERIA TO BE USED FOR OTHER FUNCTIONS, SUCH AS ASSEMBLY AREA, ETC.? ______ IF SO, WHAT IS MAXIMUM NUMBER TO BE SEATED? ______________

IS THE CAFETERIA SIZED TO ACCOMMODATE ANY ESTIMATED ULTIMATE GROWTH? ______________

DO YOU ANTICIPATE COMMUNITY USE OF THE CAFETERIA? ______________

REMARKS

KITCHEN

NO SPECIFIC INFORMATION ON THE KITCHEN AREA IS REQUIRED AS A PART OF THIS FORM.

However, there is a separate Program Data form prepared by the Office of School Food Services, South Carolina Department of Education, and it is recommended that the architect have this form completed by the school district, after which the architect should forward the form to the Office of School Food Services. That office will then consult with the districts' food service personnel after which specific recommendations will be made to the architect as to type of service, equipment list, general facilities, etc.

This correlation with the Office of School Food Services should take place before any schematic or design development kitchen plans have been started.

The Program Data form may be obtained from the above office (Room 403, Rutledge Building, Columbia, South Carolina 29201; Phone 758-7665), or from the Office of School Planning and Building.

VOCATIONAL

LIST VOCATIONAL SUBJECTS THAT WILL BE OFFERED FROM THE FOLLOWING GENERAL CATEGORIES.

AGRICULTURE

BUSINESS EDUCATION (PERSONAL TYPING SHOULD BE INCLUDED IN THIS CATEGORY)

HEALTH OCCUPATIONS

HOME ECONOMICS EDUCATION

MARKETING & DISTRIBUTIVE EDUCATION

INDUSTRIAL ARTS

TRADE & INDUSTRIAL EDUCATION

REMARKS

BOOKROOM

SUMMER BOOK STORAGE
- One Central Room ( )
- More Than One Room ( )
- Classrooms ( )
- Other ____

NUMBER OF VOLUMES TO BE STORED
- Building as designed ____
- Are you allowing for future building additions? ____
- If so, how many volumes? ____

WILL THE BOOKROOM ALSO BE USED FOR OTHER PURPOSES, SUCH AS GENERAL STORAGE? ____

REMARKS

LOCKERS

SECONDARY SCHOOLS
Lockers will be in corridors or locker alcoves? ____

TYPE OF LOCKERS
- Single-Tier ( )
- Double-Tier ( )

REMARKS

TOILET FACILITIES

NOTE: COMPLETE THIS SECTION ONLY IF THE PROJECT IS AN ADDITION TO AN EXISTING BUILDING OR CONCERNS ALTERATIONS OR RENOVATIONS TO AN EXISTING BUILDING.

FOR EXISTING BUILDING, STATE NUMBER OF CLASSROOMS WITH INDIVIDUAL TOILETS ____

STATE NUMBER OF FIXTURES IN GANG TOILETS OF EXISTING BUILDING

Boys: Water Closets ____
Urinals ____
Lavatories ____

Girls: Water Closets ____
Lavatories ____

REMARKS

REVISED

P 13-19

DIVISION 14 CHECKLISTS

14.01 INDEX OF SECTIONS INCLUDED IN THIS DIVISION

Section Number	Title	Page	Referenced From
14.02	Distribution of Final Construction Documents	14-1	Divisions 7, 10, 11, 12

14.02 DISTRIBUTION OF FINAL CONSTRUCTION DOCUMENTS

Final construction document submittals shall be sent directly to each agency by the architect and/or his engineers (with notification of transmittal to OSP&B). The architect and/or his engineers shall also be responsible for obtaining all necessary approvals from these agencies and for transmitting copies of same to OSP&B. Refer to Section 7.10, Item 2.

1. **One complete set of plans and specifications**, along with Application for Approval of Final Construction Documents (Form F6)

   TO: Office of School Planning & Building
   S. C. Department of Education
   100 Executive Drive
   Suite A-32 Santee Bldg., Columbia, SC 29210 Phone: 758-6115

2. **One complete set of plans and specifications**

   TO: Insurance Reserve Fund
   Division of General Services
   1122 Lady Street, Suite 600
   Columbia, South Carolina 29201 Phone: 758-3543

3. **One partial set of plans and specifications** consisting of:

   Site plan, architectural floor plans, including sheet(s) with space designation schedules, and electrical plans and specifications.

   TO: Field Technical Services Advisor
   S. C. ETV Center
   Drawer L
   Columbia, South Carolina 29250 Phone: 758-7244

4. **Two partial sets of plans and specifications** consisting of:

   Architectural floor plans and finish schedule; plumbing plans and specifications; mechanical plans and specifications; food service equipment list, plans, details, and specifications.

   TO: Division of Food Protection
   S. C. Department of Health and Environmental Control
   2600 Bull Street
   Columbia, South Carolina 29201 Phone: 758-5476

5. **Two complete sets of plumbing plans and specifications**
TO: Director, Division of Water Supply
S. C. Department of Health and Environmental Control
2600 Bull Street
Columbia, South Carolina 29201 Phone: 758-5544

6. **Two complete sets of plumbing plans and specifications**, including site sewage treatment facility if applicable

TO: Director, Division of Domestic Wastewater
S. C. Department of Health and Environmental Control
2600 Bull Street
Columbia, South Carolina 29201 Phone: 758-5067

DIVISION 15 REFERENCE MATERIAL

15.01 INDEX OF MATERIAL INCLUDED IN THIS DIVISION

Section Number	Title	Page	Referenced From
15.02	Recommended Specifications for Television Distribution Systems	15-1	Division 12
None	ETV—Video Tape Recording (VTR) Console Cabinets (drawings)	15-9	Divisions 3, 15
None	ETV—Outlet Requirements for VTR Console Cabinets (drawing)	15-13	Division 15
None	ETV—Roof Antenna Weatherhead Details (drawing)	15-14	Division 15
None	Science Room Gas Supply (drawing)	15-15	Division 10

15.02 RECOMMENDED SPECIFICATIONS FOR TELEVISION DISTRIBUTION SYSTEMS

1. **Subindex for this section is as follows**.

Item	Page
Definitions	15-1
General	15-2
Conduit System	15-3
Power Requirements	15-4
Distribution System Operation and Performance Considerations	15-5
Special Functions	15-6
Electronic Equipment Specifications	15-6
Coaxial Cable	15-7
Television Receptacles and Cords	15-7
Antennas	15-7
Demonstration of Performance	15-8

2. **Definitions**

a. These specifications are written as a recommended guide to the electrical engineer when he prepares his specifications for ETV distribution systems. Where the word "must" is used throughout, it denotes a recommendation to the engineer that he word this as a mandate in his specifications. Words such as "may" or "should" are to be considered as options or recommendations only.

b. **Installer**: As hereinafter referenced, means the contractor responsible for installing the television distribution system as specified by the electrical engineer. The installer will normally be a subcontractor to the electrical contractor.

c. **ITFS**: Instructional Television Fixed Services

d. **VTR**: Video tape recorder

e. **Reference signal**: For the purpose of these specifications, the standard reference signal of 0 dbmV is understood to be 1 millivolt across 75 ohms.

f. **Head-end:** The system head-end consists of the main amplification system, associated antennas, and converters used to feed the overall building distribution system.

g. **Adjacent channel**: Two VHF television channels will be considered as adjacent channels when there is less than 6 megacycles of spectrum space between them. Example: Channel 3 and Channel 4 are adjacent; Channel 6 and Channel 7 are not adjacent.

h. **Extraneous signals**: An extraneous signal is any RF signal or any television or random signal other than the signal the viewer wishes to view.

3. **General**

a. These specifications for the design and installation of TV building distribution systems have been approved by, and are the recommendations of, the South Carolina ETV Network. They are applicable for new buildings and additions to existing buildings.

If the work involves installation of a distribution system within the confines of an existing building, it is suggested that the electrical engineer consult the Field Technical Services Advisor at the S. C. ETV Center, 2712 Millwood Avenue, Columbia, South Carolina (mailling address: Drawer L, Columbia, South Carolina 29250) for applicable specifications.

b. From Section 12.15 note that all new buildings and additions to existing buildings are required to have a concealed raceway system, whether or not the wiring and the remainder of the system is to be included at the time of construction. However, it is recommended that the installation of the entire ETV system (excluding TV sets and VTR equipment) be included under the electrical engineer's jurisdiction and, in turn, a part of the overall electrical contract. The district should be consulted prior to a decision on this matter, of course.

c. The installation must conform to accepted standards for systems of this type and must meet all applicable codes and standards (see Section 12.05). It must be specified that the subcontractor for this work shall have been in the business of installing and servicing this type of system for a reasonable period of time and that he must show evidence of this and must also show evidence that he maintains a fully equipped service organization with an adequate stock of replacement parts or has overnight access to such parts.

d. The system in general must be guaranteed for one year, the same as stipulated under the general building contract. In addition, any special equipment warranties must be furnished to the owner at completion, along with all pertinent manuals, operating instructions, etc.

e. The distribution system must be capable of receiving VHF or UHF educational television channels and educational FM radio channels. The distribution system must be capable of distributing these signals, although UHF should be converted to VHF for economic reasons.

- Particular emphasis is to be placed on stations operated by the South Carolina ETV Network.

- If a school is located within the coverage area of two or more educational TV stations and/or educational radio stations, all stations having different program schedules must be received, except that in secondary schools where ITFS channels will be received, only one open-circuit ETV channel will be required to be installed on the building distribution system.

- If a school requests reception of noneducational, commercial TV stations, these stations must be fed on a separate cable to the video tape recorder area only.

f. After the building contract has been awarded, the successful sub-bidder (hereafter called the "installer") for the TV distribution system must submit to the electrical engineer for his prior approval a simple block diagram of the system to be installed. It must indicate by catalog number the type of amplifier, type of splitters and taps, and type of cable to be used.

g. At or before the final inspection and completion of the work, the installer must provide the following.

- Complete service data, including schematic diagrams and maintenance manuals of all new equipment supplied as a part of this contract.
- A complete "as-built" system block diagram showing as accurately as possible all equipment, splitters, taps, and outlets; this must be mounted under glass and attached to the wall in a secure manner where directed by the engineer at the ETV head-end location. Notes relating this diagram to the diagram required in the paragraph below should be included.
- A complete diagrammatic building floor plan at suitable scale on which the locations of all equipment, splitters, taps, and outlets are specifically located. Cable routing throughout the building is to be accurately shown.
- A complete list of signal strength readings taken on each channel used in the school and at the input of the head-end amplifier, the output of the head-end amplifier, the input and output of all subsequent re-amplifiers, and all television outlets in the system. (Readings to be made with an approved field strength meter relative to 0 dmbV).

4. Conduit System

a. All ETV conduit, outlet boxes, and cabinets must be for ETV cable only. Joint use with sound systems, fire, telephone, etc., is not satisfactory.

b. TV outlets should be located in all classrooms and other instructional areas, principal's and assistant principal's offices, conference rooms, library, library workrooms, A/V rooms, band rooms, choir rooms, vocational classrooms, cafeterias, and at least one outlet on each side of the stage in an auditorium area; also locate in any other areas designated by the district. Do not install outlets in vocational shops where TV viewing could be hazardous.

c. TV outlet boxes in classrooms should be a maximum of 66" from floor and located to the left or right of chalkboard (window side where applicable). Outlet boxes in administrative and noninstructional areas will be the same height as normal convenience outlets. All outlet boxes must be two-gang type, 4" x 4" x 2 1/4" deep, with single-gang plaster rings. Plaster rings must be of sufficient depth to face with finish of wall and to extend to the block void or wall hollow.

d. A duplex convenience A/C outlet must be provided at the same height as each TV outlet box and within 12" horizontally.

e. TV outlet boxes should have only one entry and one exit of 3/4" conduit. Do not use outlet box as junction point because equipment small enough to fit this size area is not applicable.

f. All conduit between TV outlets must be a minimum of 3/4" in size.

g. TV outlet conduit runs under 300' total length may have up to 10 outlets in series. Outlet conduit runs between 300' and 500' should have no more than 6 to 8 outlets in series.

h. If TV outlet conduit runs exceed 500' length, a TV cabinet or backboard must be installed for an extended amplifier; this can be either a metal cabinet box 24" x 24" x 6" or a plywood backboard 24" x 24" x 3/4". The TV cabinet or backboard must be connected by conduit to the main amplifier location, or to the nearest TV cabinet or backboard that is connected to the main amplifier location, as follows: for runs up to 600', 2" conduit must be provided and for runs in excess of 600', 3" conduit must be provided. Pull boxes (interior) or "hand holes" (exterior) must be provided at a maximum of every 300', or less if dictated by code requirements.

A duplex A/C convenience outlet must be provided at each TV cabinet or adjacent to each backboard.

i. In additions to existing buildings, the nearest new line amplifier location must be connected by conduit to the existing main amplifier location as follows: for runs up to 600', 2" conduit must be provided and for runs in excess of 600', 3" conduit must be provided. Full boxes (interior) or "hand holes" (exterior) must be provided at a maximum of every 300', or less if dictated by code requirements.

j. A 3/4" plywood backboard must be provided at all main amplifier or head-end locations. The size must by 4' x 4' for elementary schools and 4' x 8' for all secondary schools.

The main amplifier location must have at least three duplex AC convenience outlets.

k. The main amplifier location must have 2" rigid conduit minimum to dip pole for CATV input and also a 2"-conduit stubbed to the outside for any future ITFS tower.

l. The main amplifier location or head-end location must be the point at which the open-circuit ITFS and VTR will be mixed together and/or any other source for distribution to building.

m. The main amplifier should be located in the central part of the building. This is to shorten the main trunk line or feeder line.

n. There must be a weatherhead connected to the main amplifier location for open-circuit antenna. It should be 2" rigid conduit 5' above roof at highest point (where applicable) within 100' of head-end. See drawing on page **15-14**.

o. There must be a VTR (video tape recorder) three-gang outlet box in the wall at 42" above floor at the location of the VTR cabinet (this will normally be in the library AV storage room or the library workroom, at the district's decision) to provide a connection for VTR playback to classrooms; this outlet box should connect to the main amplifier location with 1"-conduit. A three-gang TV outlet box should be provided adjacent to the VTR outlet box. See drawing on page 15-13.

p. To minimize potential differences, a #8 wire must be provided from the building electrical ground to all TV pull stations with AC receptacles.

q. There must be a pull wire provided in all conduit—nylon cord 200-pound minimum pull strength.

r. The final drawings must have a riser diagram with numbered junction points, such as TV-1, TV-2, TV-3, identified by area, room, or space number. Riser must agree with prints as to what connects with what and where.

5. **Power Requirements**

a. AC duplex power outlets must be provided at all locations where power is needed for operation of system components. Cords between amplifier cabinets (if used) and AC receptacles must not exceed 4 feet. AC power cords must be installed with plug retainers so that they cannot be unplugged without proper tools.

b. Where a new power outlet is installed to provide power for amplifiers in the television system, such outlets must be on a separate circuit. In an existing building where the existing electrical system makes this impractical, a suitable AC overload device should be provided as a part of the wiring.

c. Power cords between AC power outlets and equipment cabinets must be 14/3 S cable minimum.

d. Three-wire power circuitry and wiring devices must be used throughout, where available.

e. If power is available at an amplifier location, three-wire grounding type outlets must be provided and installed in lieu of coro can adapters.

f. See Item 4, Paragraph d, concerning location of AC power outlets for each TV outlet box.

g. An earth or water pipe ground must be provided and the installer should connect all head-end equipment to it (earth ground, if used, must be a minimum 3/4" x 6' rod with #6 copper wire to cabinet).

6. **Distribution System Operation and Performance Considerations**

a. The system as installed must provide for distribution of properly balanced and adjusted television signals.

b. All equipment must be rated for continuous duty operations and must be installed and operated as recommended by the equipment manufacturers.

c. The system must be able to distribute N.T.S.C. color television signals without degradation.

d. The system must meet basic radiation limits as specified by the FCC.

e. All devices installed in coaxial cable must be designed to match the characteristic impedance of the cable.

f. The overall distribution system must have a VSWR of 1.2 to 1 or better.

g. The system bandwidth, exclusive of the head-end amplifier, must be from 12 mHz to 890 mHz, flat within 1.5 db across the VHF portion and within 3.0 db across the UHF portion.

h. Television signal levels at all receivers must be well balanced. System levels will be termed "well balanced" when the difference across the VHF band (channels 2 through 13) does not exceed 6 db. In the UHF band (channels 14 through 83) the difference must not exceed 6 db.

i. The highest FM radio signal level must be 20 db below the visual carrier level of the highest TV channel carried on the system.

j. Where required, FM band-pass filters must be provided to reduce the level of all undesirable FM signals to a level below amplifier overload.

k. The minimum output at any outlet in the system must be +6 dbmV, the output being visual CXR, open or ITFS channel as listed in Item 3, Paragraph g.

l. The maximum signal available at any receptacle, making use of normally viewed open and/or ITFS channels as specified by the district, must not exceed +20 dbmV visual CXR level.

m. A signal on any specific channel, measured at any television receptacle in the system, must be within 15 db of the same signal measured at any other receptacle in the system.

n. The minimum signal input to the head-end (distribution) amplifier must be 8 dbmV.

o. There must be a minimum RF isolation of 12 dbm between receiver and feeder line throughout the system for VHF.

p. There must be a minimum RF isolation of 24 dbm between receivers attached to the system.

q. Extraneous signals present throughout the system must not exceed a level 50 dbm below any desired signal.

7. **Special Functions**

a. Provisions for local origination of television signals for distribution throughout the school must be provided.

b. In all secondary schools, provisions for distribution of the South Carolina ETV ITFS signals throughout the school must be provided as directed. The input to the distribution system must be from an agreed-upon demarcation point from the South Carolina ETV Network.

c. If specifically requested by the district, the installer may present a proposal providing for the simultaneous distribution and viewing of all signals specified within the school complex on a single cable.

d. As an alternative to Paragraph c above, the installer may propose to provide for simultaneous distribution of all signals to be viewed in the school or a multicable system.

8. **Electronic Equipment Specifications**

a. Solid-state or transistorized equipment must be required.

b. Head-end amplifiers

- Amplifiers must be capable of providing at least 6 dbm more output than the actual loss of the system the amplifier feeds (see Item 12).

- All channel amplifiers are acceptable in any system having an actual loss figure of 40 dbm or less. Where, because of a calculated figure, a system with a single broadband amplifier is contracted for and the actual loss figure exceeds 40 dbm, the installer must conform with the third and fourth subparagraphs under Paragraph b, at no extra cost to the district (see the fourth subparagraph for an exception, however).

- Should the system have a calculated loss figure in excess of 40 dbm and less than 60 dbm, a broadband amplification system will be acceptable. Where the use of more than one broadband amplifier in cascade is proposed, specific performance specifications of such an arrangement must be set forth. If the installer prefers, he may set forth the merits of the use of strip amplifiers for a system with these losses and propose their use as an alternate (see the fourth subparagraph under Paragraph b for an exception, however).

- For systems carrying ETV ITFS channels or adjacent channels, single-channel AGC strip amplifiers must be used.

- If single-channel amplifiers are used, suitable mixing networks must be provided to combine the outputs of these amplifiers properly before the signals are fed into the cable system.

- Band-pass filters must be used ahead of all strip amplifiers on adjacent channels.
- The amplifier supplied must serve all outlets on the system without overload or distortion.

c. Preamplifiers, Reamplifiers, and Pads

- Necessary preamplifiers or pads must be used to balance the input signals of the system before they are fed into the head-end amplifiers.
- Reamplification is required in any system being provided in building additions where existing buildings are equipped with distribution systems, unless specifically waived by the engineer.
- The signal input to a reamplifier must not be less than 8 dbmV.
- The installation of taps for reamplification must not degrade services on the existing system. Do not install taps in cable between main amplifier and reamplifier.

d. System splitters must be provided where necessary. VSWR of splitters must be less than 1.5 to 1.

9. **Coaxial Cable**

a. All coaxial cable supplied must be that of a known manufacturer with a maximum attenuation of 2.0 db per 100 feet on channel 2, a maximum attenuation of 4.0 db per 100 feet on channel 13, and a maximum attenuation of 8 db on channel 35.

b. The cable must be of new manufacture with noncontaminating jacket meeting JAN specifications.

c. All cable attached to electronic equipment, active or passive, must be labeled to show function and location of the other end of the cable. All labels must be typed, printed or made with a suitable labeling device, and securely fastened to the cable.

d. Appropriate fittings must be used when it is necessary to extend a length of cable. No splices will be allowed within a conduit.

e. Where appropriate, the installer may use double-shielded cable (see Item 2, Paragraph e).

10. **Television Receptacles and Cords**

a. Receptacles must provide 75 ohm access to the distribution system.

b. Receptacles must be of an autoplug/autojack type connectors.

c. Receptacles using screw-on type connections must be used only for video tape recorder inputs.

d. Television receiver-to-receptacle cords must be furnished for each television set, plus 10 spares.

e. Cords must be made from RG-59 copper braid shield flexible cable with a minimum length of 12 feet. Matching transformers must be provided where required for existing TV receivers.

11. **Antennas**

a. All antennas must be of a 75 ohm, stub-matched, CATV type.

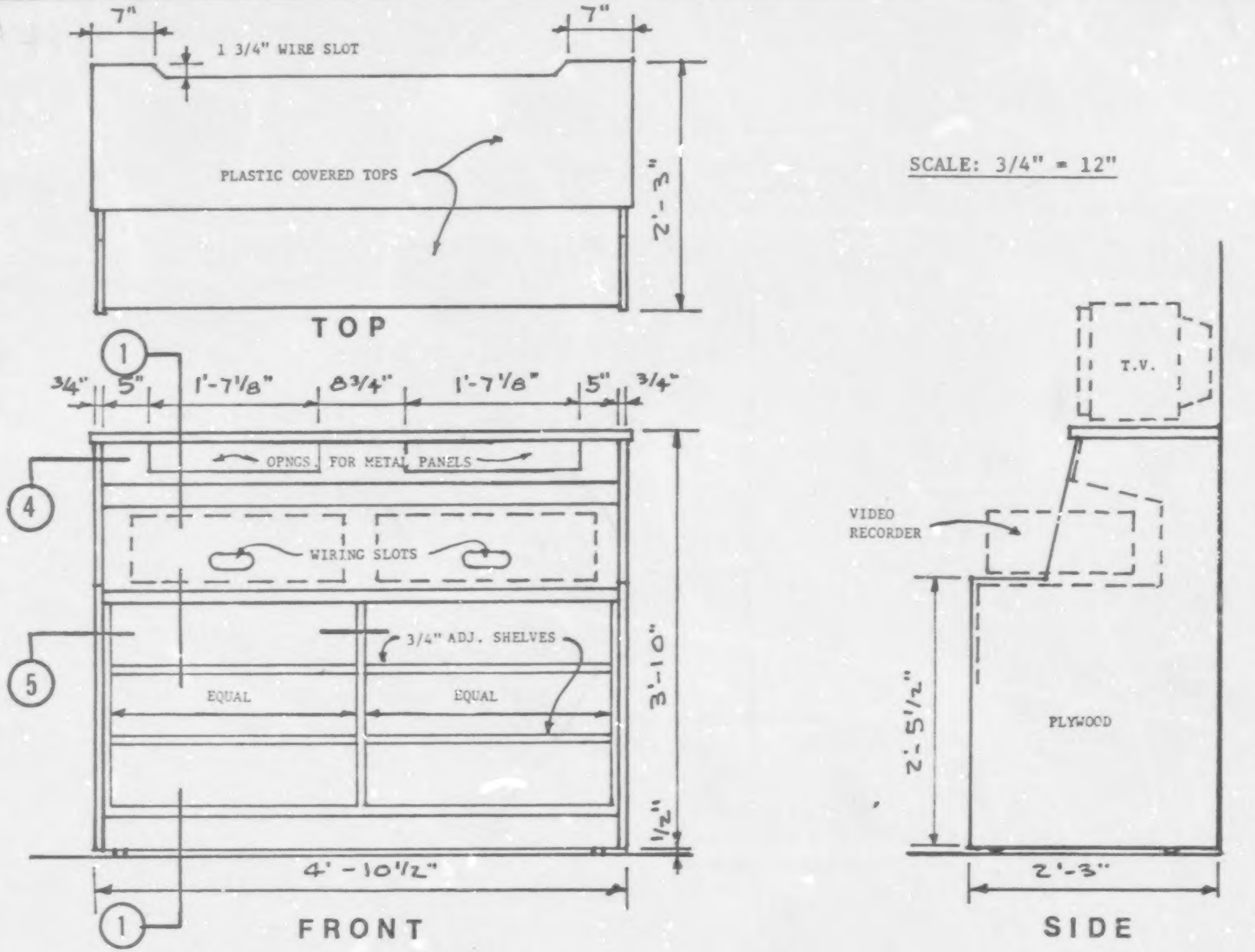
12. Demonstration of Performance

a. The installer must demonstrate compliance with the plans and specifications at the time of a final inspection by South Carolina ETV Field Technical Services as follows.

- Normally viewed television signals (as outlined in Item 3, Paragraph e) are to be inserted into the system head-end amplifier at 8 dbmV. This signal will not be less than + 6 dbmV or more than + 20 dbmV at any outlet selected by the inspector (see Item 6, Paragraph k).
- With the normally viewed television signals feeding the system and after selected outlets have been checked, the installer must demonstrate the reserve gain capability of the amplifier (see Item 8, first subparagraph of Paragraph b).
- Picture quality from the ETV ITFS source, if any, and/or the off-the-air signals must be observed on a television receiver (color, if applicable). A comparison of observed picture should exhibit no degradation of quality (noise, distortion smearing, ghosting, cross modulation, etc.).
- Should such a demonstration of performance show that the installer has not properly balanced the system and that picture degradation is present or that reserve or output gain is not as specified, a second performance demonstration must be arranged.
- Should a second performance demonstration fail, the installer must agree to correct the system deficiencies under the supervision of the district's service organization or consultant and must further agree to pay the district's service organization or consultant their usual fees for supervisory service, if applicable.

ETV - VIDEO TAPE RECORDING (VTR) CONSOLE CABINETS

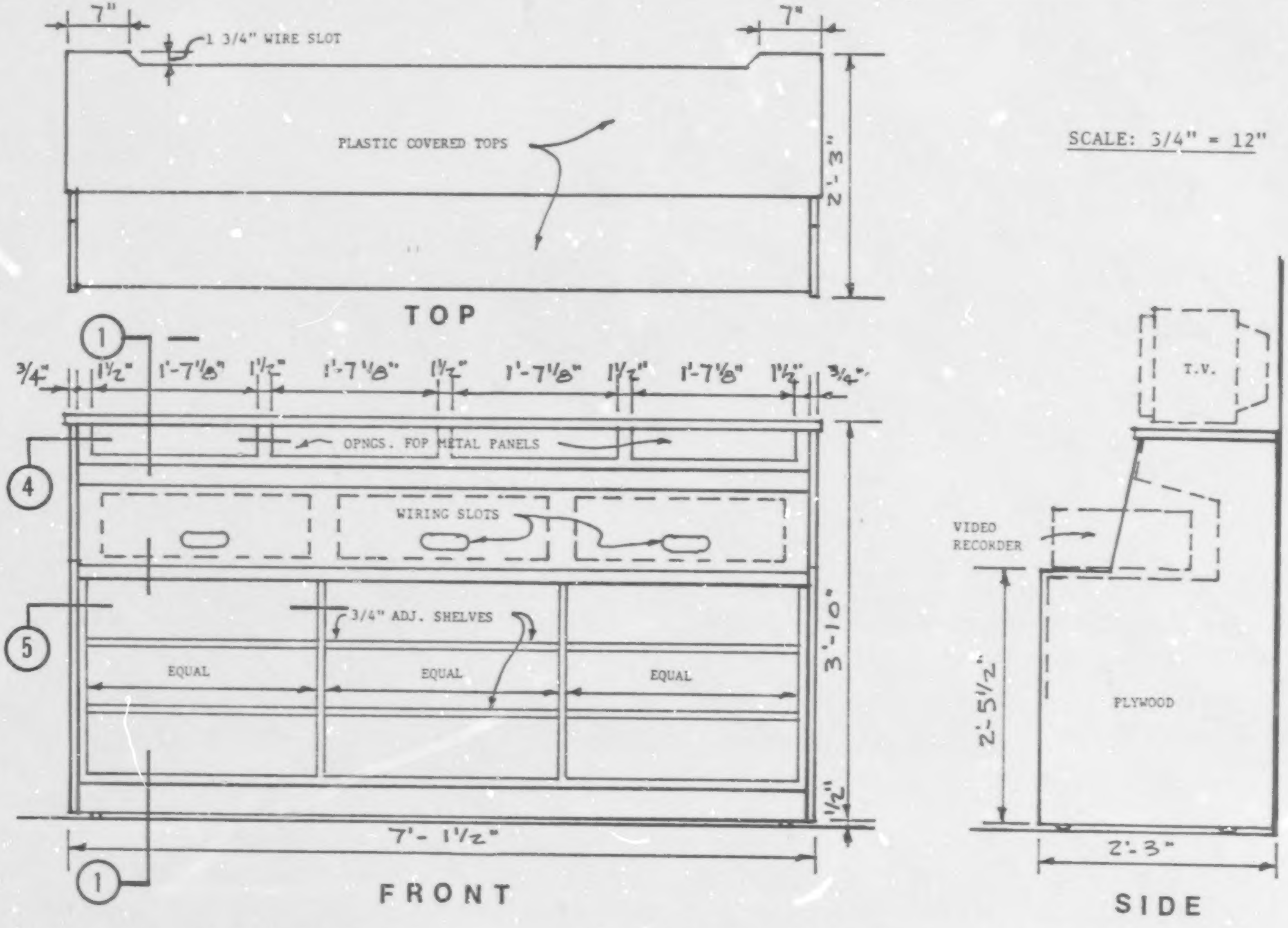
REVISED


7"
7"
1 3/4" WIRE SLOT
PLASTIC COVERED TOPS
2'-3"
TOP
SCALE: 3/4" = 12"
①
3/4"
5"
1'-7 1/8"
8 3/4"
1'-7 1/8"
5"
3/4"
OPNGS. FOR METAL PANELS
④
WIRING SLOTS
3/4" ADJ. SHELVES
⑤
EQUAL
EQUAL
3'-10"
1/2"
4'-10 1/2"
①
FRONT
T.V.
VIDEO RECORDER
PLYWOOD
2'-5 1/2"
2'-3"
SIDE

P 15-9

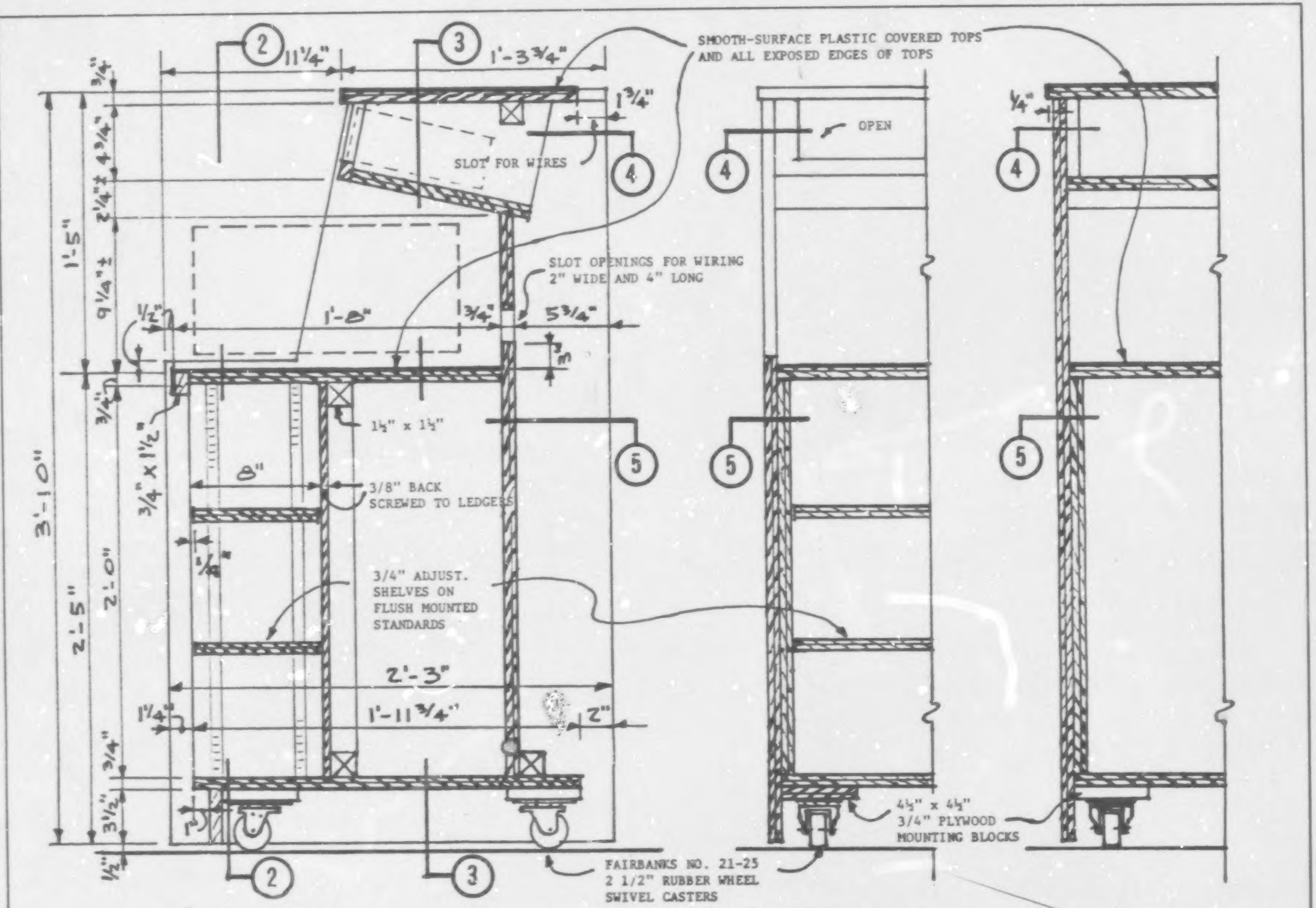
SHORT UNIT (TO ACCOMMODATE TWO 3/4" VIDEO RECORDERS OR THREE SMALL 1/2" VIDEO RECORDERS)

REVISED


7"
1 3/4" WIRE SLOT
7"
PLASTIC COVERED TOPS
2'-3"
TOP
SCALE: 3/4" = 12"
1
3/4"
1½"
1'-7⅛"
1½"
1'-7⅛"
1½"
1'-7⅛"
1½"
1'-7⅛"
1½"
3/4"
OPNGS. FOR METAL PANELS
4
WIRING SLOTS
5
3/4" ADJ. SHELVES
EQUAL
EQUAL
EQUAL
3'-10"
½"
7'- 1½"
1
FRONT
T.V.
VIDEO RECORDER
2'-5½"
PLYWOOD
2'-3"
SIDE

P 15-10

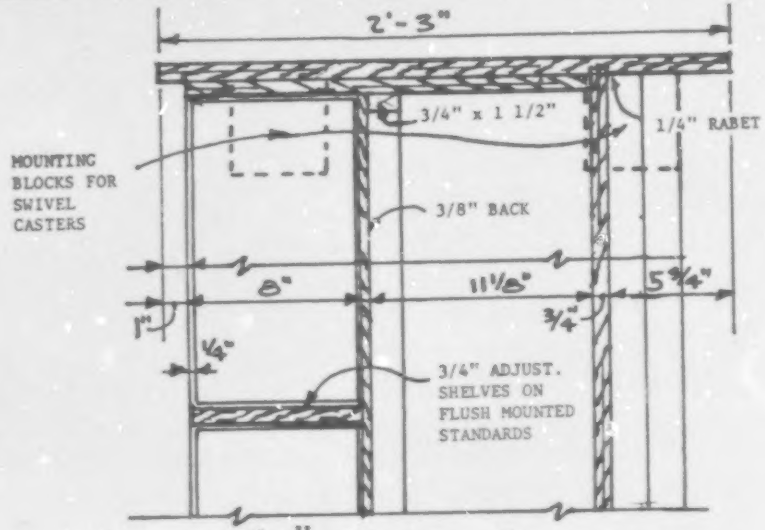
LONG UNIT (TO ACCOMMODATE THREE 3/4" VIDEO RECORDERS, OR FOUR SMALL 1/2" VIDEO RECORDERS)


SMOOTH-SURFACE PLASTIC COVERED TOPS
AND ALL EXPOSED EDGES OF TOPS
②
③
11¼"
1'-3¾"
1¾"
¾"
4¾"
3¼"±
9¼"±
1'-5"
SLOT FOR WIRES
④
OPEN
¼"
SLOT OPENINGS FOR WIRING
2" WIDE AND 4" LONG
½"
1'-8"
¾"
5¾"
3"
¾"
¾" x 1½"
1½" x 1½"
⑤
8"
3/8" BACK
SCREWED TO LEDGERS
3'-10"
2'-5"
2'-0"
⅜"
3/4" ADJUST.
SHELVES ON
FLUSH MOUNTED
STANDARDS
2'-3"
1'-11¾"
1¼"
2"
¾"
3½"
1"
½"
4½" x 4½"
3/4" PLYWOOD
MOUNTING BLOCKS
FAIRBANKS NO. 21-25
2 1/2" RUBBER WHEEL
SWIVEL CASTERS

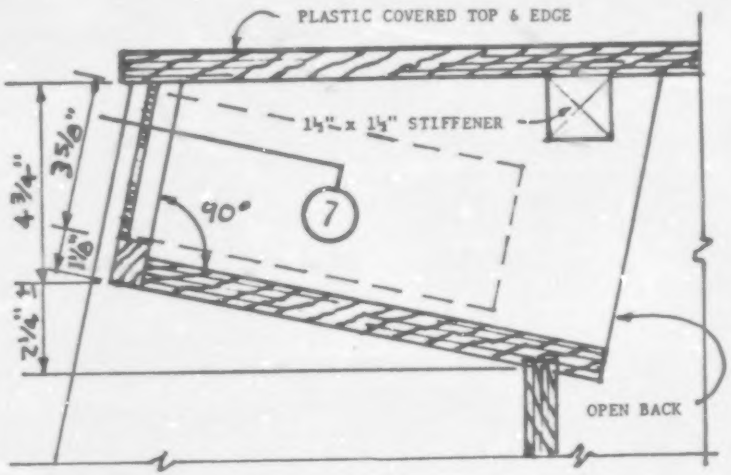
1½" SECT. 1 – 1

1½" SECT. 2 – 2 & SECT. 3 – 3

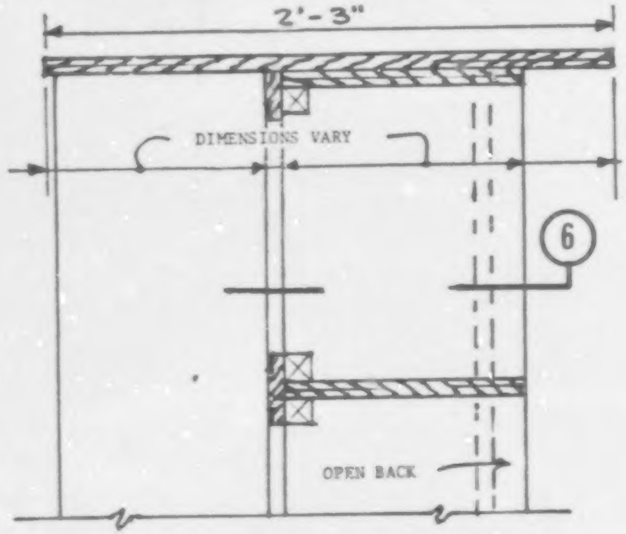
REVISED


2'-3"
MOUNTING BLOCKS FOR SWIVEL CASTERS
3/4" x 1 1/2"
1/4" RABET
3/8" BACK
8"
11 1/8"
5 3/4"
1"
3/4"
1/4"
3/4" ADJUST. SHELVES ON FLUSH MOUNTED STANDARDS

1 1/2" SECT. 5


PLASTIC COVERED TOP & EDGE
1½" x 1½" STIFFENER
4 3/4"
3 5/8"
1 1/8"
2 1/4"
90°
7
OPEN BACK

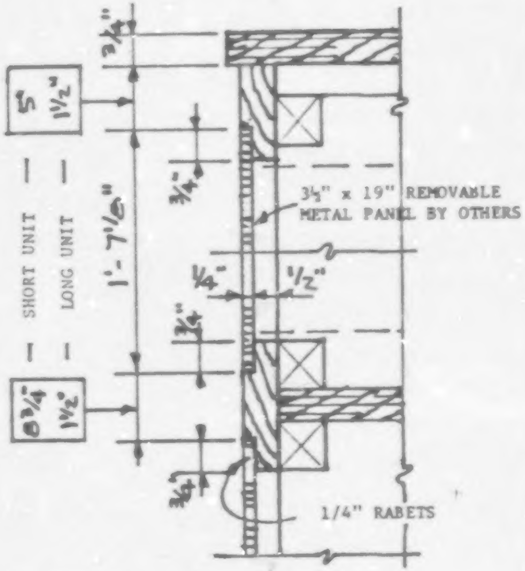
3" SECT. 6


2'-3"
DIMENSIONS VARY
6
OPEN BACK

1 1/2" SECT. 4

NOTE:

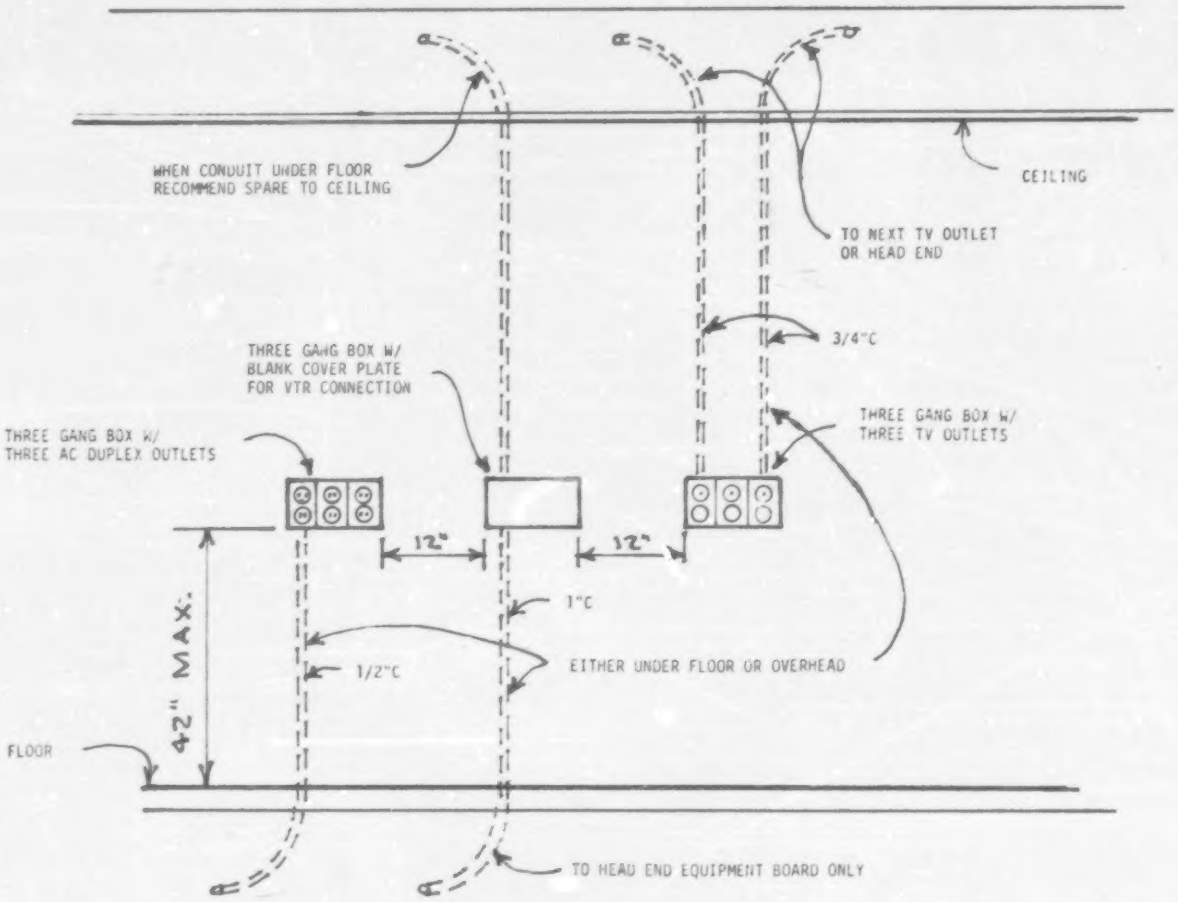
- ALL MATERIAL TO BE 3/4" PLYWOOD UNLESS OTHERWISE SHOWN.
- FINISH ALL EXPOSED EDGES OF PLYWOOD WITH V'D OR SQUARE EDGING, OR APPLIED TAPE.
- ARCHITECT SHALL CHOOSE BETWEEN PAINT OR NATURAL FINISH MATERIALS WHERE EXPOSED.


3/4"
5"
1½"
SHORT UNIT
LONG UNIT
1'-7 1/8"
3/4"
3½" x 19" REMOVABLE METAL PANEL BY OTHERS
1/4"
1/2"
3/4"
8 3/4"
1½"
3/4"
1/4" RABETS

3" SECT. 7

P 15-12

REVISED

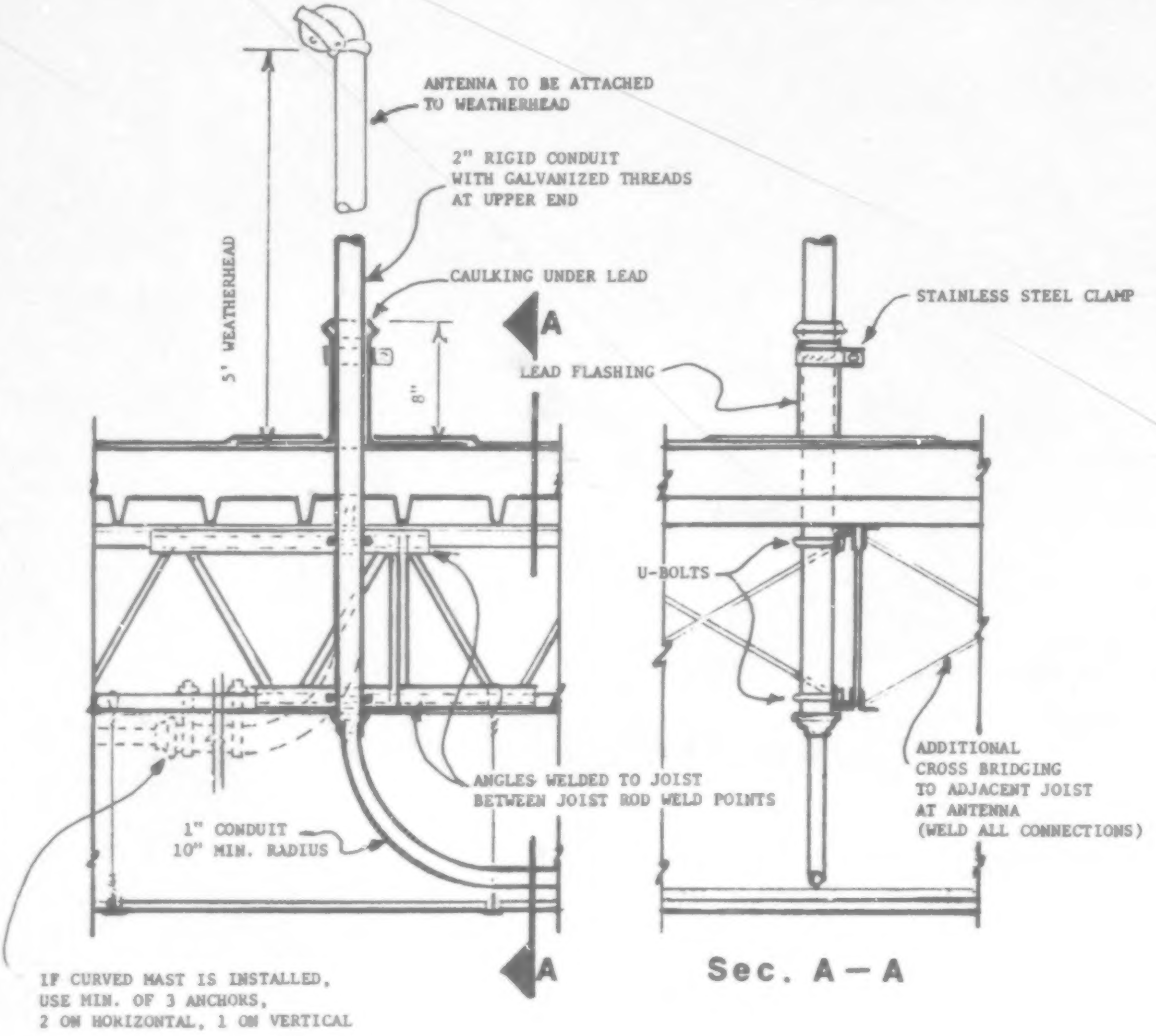

WHEN CONDUIT UNDER FLOOR
RECOMMEND SPARE TO CEILING
CEILING
TO NEXT TV OUTLET
OR HEAD END
3/4"C
THREE GANG BOX W/
BLANK COVER PLATE
FOR VTR CONNECTION
THREE GANG BOX W/
THREE AC DUPLEX OUTLETS
THREE GANG BOX W/
THREE TV OUTLETS
12"
12"
1"C
42" MAX.
1/2"C
EITHER UNDER FLOOR OR OVERHEAD
FLOOR
TO HEAD END EQUIPMENT BOARD ONLY

(ABOVE NEEDED ON WALL BEHIND VTR CABINET)

Typical Elevation - not to scale

TYPICAL OUTLET REQUIREMENTS FOR VTR CONSOLE

ETV - ROOF ANTENNA WEATHERHEAD DETAIL


ANTENNA TO BE ATTACHED TO WEATHERHEAD
2" RIGID CONDUIT WITH GALVANIZED THREADS AT UPPER END
CAULKING UNDER LEAD
5' WEATHERHEAD
8"
A
LEAD FLASHING
STAINLESS STEEL CLAMP
U-BOLTS
ANGLES WELDED TO JOIST BETWEEN JOIST ROD WELD POINTS
1" CONDUIT 10" MIN. RADIUS
ADDITIONAL CROSS BRIDGING TO ADJACENT JOIST AT ANTENNA (WELD ALL CONNECTIONS)
IF CURVED MAST IS INSTALLED, USE MIN. OF 3 ANCHORS, 2 ON HORIZONTAL, 1 ON VERTICAL
A
Sec. A—A

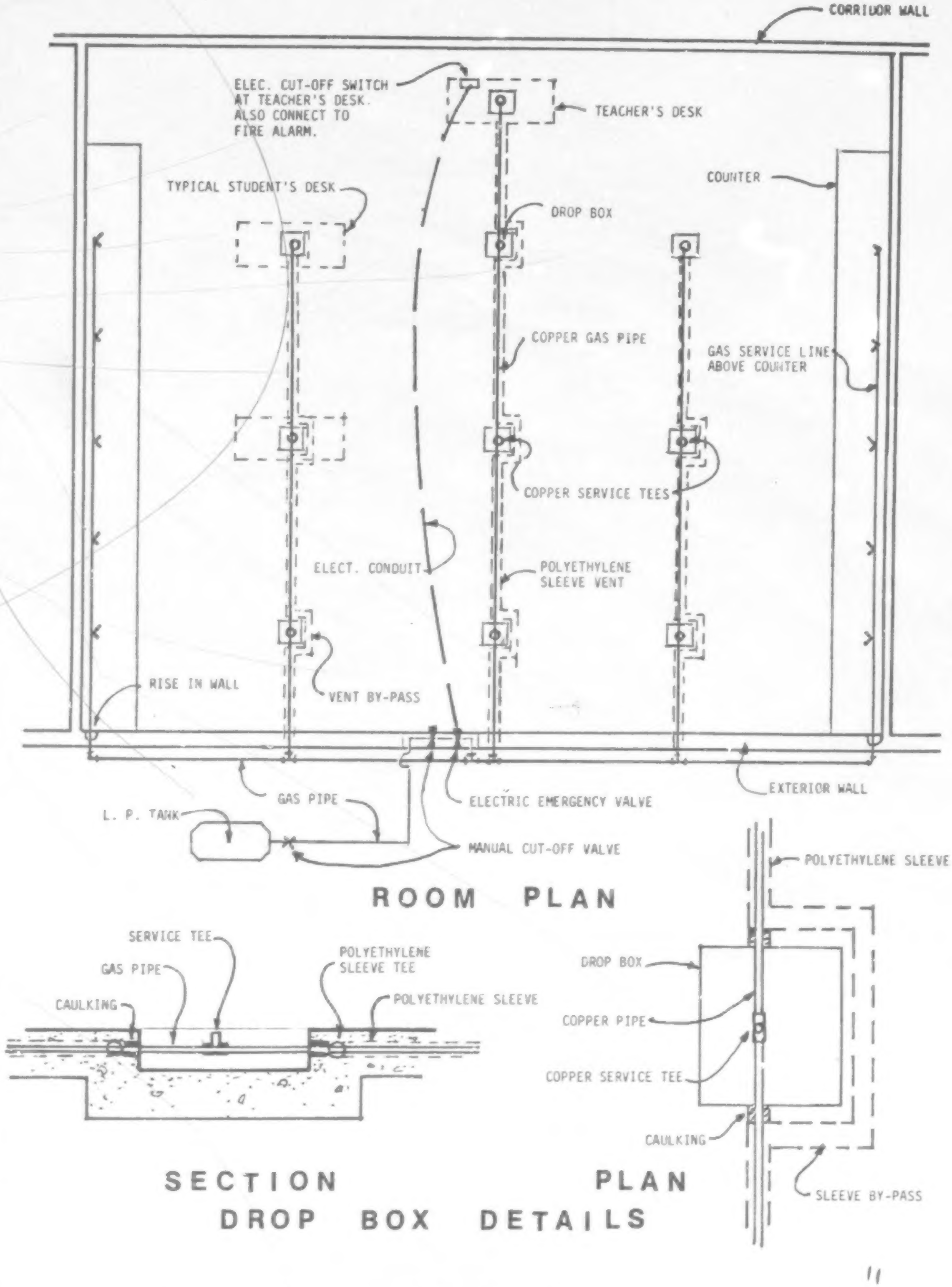
ETV ANTENNA WEATHERHEAD SECTION DETAILS

NOTES:

1. THE FIELD TECHNICAL SERVICES ADVISOR AT THE S. C. ETV CENTER (MAILING: DRAWER L, 2712 MILLWOOD AVENUE, COLUMBIA, S. C. 29250) SHOULD BE CONSULTED DURING THE DESIGN DEVELOPMENT PHASE OF THE DRAWINGS TO DETERMINE HEIGHT, TYPE AND LOCATION OF ANTENNA REQUIRED FOR A PARTICULAR PROJECT. NORMALLY, THE ANTENNA SHOULD BE LOCATED ON THE HIGHEST ROOF POINT.

   THE MAJORITY OF ANTENNAE USED IN SCHOOL PROJECTS WILL BE OF A HEIGHT THAT WILL NOT REQUIRE "GUYING." HOWEVER, WHEN GUYING IS REQUIRED, IT IS SUGGESTED THAT THE GUY POINTS ON THE ROOF BE OF 1¼" RIGID CONDUIT TO PROJECT APPROXIMATELY 8" ABOVE ROOF, ATTACHED TO STRUCTURE SAME AS INDICATED FOR MAIN MASTHEAD, AND CAPPED WITH SCREW CAP AND WELDED EYE FOR GUY ATTACHMENT.

2. THE ABOVE IS SUGGESTED WEATHERHEAD DETAILING FOR STEEL JOIST/STEEL DECK CONSTRUCTION. HOWEVER, IN ALL CASES THE STRUCTURAL ENGINEER SHOULD DESIGN TO MEET INDIVIDUAL CONDITIONS AND THE TYPE CONSTRUCTION USED IN ORDER TO INSURE STRUCTURAL INTEGRITY.


CORRIDOR WALL
ELEC. CUT-OFF SWITCH AT TEACHER'S DESK. ALSO CONNECT TO FIRE ALARM.
TEACHER'S DESK
TYPICAL STUDENT'S DESK
COUNTER
DROP BOX
COPPER GAS PIPE
GAS SERVICE LINE ABOVE COUNTER
COPPER SERVICE TEES
ELECT. CONDUIT
POLYETHYLENE SLEEVE VENT
RISE IN WALL
VENT BY-PASS
GAS PIPE
ELECTRIC EMERGENCY VALVE
EXTERIOR WALL
L. P. TANK
MANUAL CUT-OFF VALVE
SERVICE TEE
GAS PIPE
POLYETHYLENE SLEEVE TEE
CAULKING
POLYETHYLENE SLEEVE
POLYETHYLENE SLEEVE
DROP BOX
COPPER PIPE
COPPER SERVICE TEE
CAULKING
SLEEVE BY-PASS

ROOM PLAN

SECTION PLAN

DROP BOX DETAILS

11

SCIENCE ROOM GAS SUPPLY
AN ALTERNATE METHOD OF CONSTRUCTION